

Transfer and Evaluation of Building
or
A Building is Not a Bus

Lars Reuterswärd

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OR
A BUILDING IS NOT A BUS

Lars Reuterswärd

Lund University, Sweden

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During the past ten years I have been working with matters of development and evaluation of construction in developing countries. This has, among other things, led to five evaluation reports which are accounted for in chapter 5. I would like to thank my co-authors of these reports.

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Lund, March 1984

Lars Reuterswärd



Savoir pour prévoir
prévoir pour pouvoir

Auguste Comte
1798-1857

CONTENTS

1	INTRODUCTION	
1.1	Context	9
1.2	First Narrative: The Bus	14
1.3	Second Narrative: The Bike	16
2	BUILDING IN DEVELOPING COUNTRIES	
2.1	Need for Building	19
2.2	Role of Building Sector	21
2.3	Role of Expatriate Companies	25
2.4	Role of Aid	27
2.5	Market Penetration	30
3	TRANSFER OF BUILDING TECHNOLOGY	
3.1	Two Examples	33
3.2	Development Theory	37
3.3	Technique and Society	40
3.4	The Concept Transfer	43
3.5	Appropriate Technology	48
3.6	Characteristics of Building Technology	51
3.7	Choice of Technology	56
4	EVALUATION OF BUILDING IN AID	
4.1	A Perception of the Issue	63
4.2	Evaluation Research	66
4.3	Some Handbooks	84
4.4	Case Studies	99
5	A FEW ATTEMPTS	
5.1	Introduction	105
5.2	Emergency Housing	105
5.3	School Construction	116
5.4	Water Development	124
5.5	Hospitals	128
5.6	Regional Action Planning	134
6	CONCLUSIONS	
6.1	State of the Art	141
6.2	The Issue	142
6.3	Further Research	154
6.4	Third Narrative: The House	154
	SUMMARY	159
	REFERENCES	175
	ANNEXES	
	1. Emergency Housing	183
	2. School Construction	195
	3. Water Development	211
	4. Hospitals	229
	5. Regional Action Planning	237

1 INTRODUCTION

1.1 Context

Is architecture researchable? I believe that most architects doing research have the ambition that research should generate new knowledge of a general validity concerning the building and the physical environment as an entirety. This is a reflection of the most significant characteristic in the professional method of architects; to synthesize a series of technical, economical, esthetic, social, functional and other factors.

The manner in which science has developed implies a contradictory method; quality is achieved by delimiting the problem at the cost of relevancy. It is probable that this contradiction between a "shallow and wide" professional approach and a dominating "narrow and deep" scientific tradition is a reason why relevant architectural research is renowned for being of mediocre intra-scientific quality. For this very reason, some architects have accepted to delimit the research at the cost of relevancy to designing architects.

It should be stated that this study does not seek to nullify the contradiction between the approaches of profession and science. Instead of sacrificing intra-scientific quality for professional relevancy - or vice versa -, the study aims at developing means and methods for enhancing the understanding of choice and transfer of building technology, in particular, to indicate an analytical frame of reference for evaluating buildings and building projects which have come into being by means of aid. The aim is that discussions and findings of this study will contribute towards better and more relevant evaluation and evaluation research of such projects in the future.

The approach is thus synthesizing within specific boundaries. These are:

1. The concept "evaluation" is understood as feedback of experiences gained from the study of completed projects (ex-post).

The core of the architecture profession, which is the designing, is based on knowledge of a whole series of partly incomparable or incompatible variables. The professional method is to appraise (ex-ante) and optimize these variables with the help of know-how, intuition, taste and creativity. This is also called the "black-box" method.

A prerequisite for a successful outcome of the use of this method is, among other things, the opportunity to maintain and gain knowledge from the contemplation and study of the outcome of earlier designs. This is not always the case at present, when the profession is more



Figure 1:1 Experiences gained from the erection of buildings should be fed back to designers and decision makers.

and more geared toward producing good designs rather than good buildings, particularly when the buildings are built overseas. The architect is not likely to ever see his building, talk to the construction worker or, even less, to the user. Evaluation is suggested as a means of counteracting this state of the art.

2. The principal subject is buildings which have come into being as a direct consequence of multi- or bi-lateral aid.

Aid projects, from the evaluators' point of view, have advantages compared to common domestic projects. Aid projects usually have specific programme goals, pre-determined allotted time for completion, a budget and sometimes even an identified target group. Aid projects are, by definition, aimed at improving the conditions of the receiver. This often implies the transfer of know-how and /or technology from industrialized countries to the receiving country, which partly explains the donor's interest in the consequences and results of this transfer.

3. The focus of the study is primarily on the evaluation of the investment phase, and secondarily of the operation phase.

This interest in the investment phase of building projects can be justified by the following conditions. Out

of the total budget for bilateral aid, a typical 40 % is allocated to building or infra-structural construction projects. A corresponding share of the national resources for investment is used by most developing countries for construction activities. SIDA has furthermore calculated that out of the programmes which include any construction component at all, the share of the budget for this purpose is on the average 70 %.

It could be argued that building is comparatively more expensive and hence more important to study in poor developing countries than in the industrialized countries. An example can illustrate this: The cost of building one m² of basic standard housing in Vietnam is equal to the cost of 5-10 monthly wages of skilled labour. In Sweden a m² corresponds to two weeks. To the user, the cost of construction is some 10-20 times more expensive in Vietnam.

An evaluation should not only describe encountered problems and inaccuracies of a program, but also indicate alternative, more efficient and promising courses of action. It is exactly during the investment phase that major decisions are made affecting the cost level, both of investments and annual cost of operation. An evaluation of the investment phase is likely to generate technically viable alternatives.

4. The concept "synthesizing approach" is to be understood in relation to the basic disciplines of architecture and building technology.

There are, of course, other and more general levels at which the subject could be equally studied. These are, a o, represented by the social and political sciences. The selected level should aim at guaranteeing that the results of evaluation are relevant and provide major explanation for buildings as such, as well as for relations between selected basic disciplines. On the other hand, another goal is that the results should be general enough to meaningfully relate to the societal conditions, which are the more common subjects of evaluations.

5. The study seeks to make use of and apply current theories and methods developed within other disciplines, e g development research and research on evaluation.

Architectural research, at the level selected for this study, cannot reasonably become a laboratory science. The research is applied, and the strategy has been to establish the validity of other disciplines in relation to the subject under study by means of iteration. This is to say that models and theories have successively been tested, evaluated and modified in the case studies. This method, iteration, is equally central to the designing architect.

6. The aim of the research is normative.

The goal is not that evaluation should primarily explain causal and other relations, but rather that it should generate viable alternative courses of action. The intrinsic normative element can be summarized: The demand for building is great, but a larger share of the resources is not likely to be made available for this purpose. Let us thus seek ways and means of increasing the usefulness of each building, and to reduce the unitary cost so that more benefit can be achieved with available resources.

Several studies have tried to establish how good buildings and architecture should be designed in developing countries. This study does not seek to be normative in this specific manner. It is believed that buildings will have to be widely varied in different countries, as well as within a given country. The normative judgement "good" can only be meaningfully understood in relation to factors such as the aims and ambitions of involved local and international agencies, the process through which the building has come into being and the local societal factors which have influenced the process and are influencing the use of the building. The aim of evaluation is eventually to redefine these aims and indicate alternative processes based on a more thorough understanding of dominating societal factors, and to learn to manipulate them.



Figure 1:2 Building as a product. This concept should be avoided, especially in aid projects (New York, USA).

The study in itself does not have a narrowly-defined target group. It is believed that the findings would be equally useful to evaluators, programme administrators and consultants in donating and receiving countries alike, and that the application of the findings would be in the best interest of the ultimate receiver of buildings through aid.

This study seeks to support the following statements:

- increased efficiency is essential in the use of available resources for construction in developing countries
- aid and technology transfer are legitimate means of enhancing and modernizing the construction sector in developing countries
- building technology is essentially different from other kinds of technology
- theory literature on evaluation does not take the characteristics of building into consideration
- there is no set of methods, be it qualitative or quantitative, which is universally applicable in this context
- handbooks on evaluation do not take the characteristics of building into consideration
- evaluation case-studies frequently lack explanatory power with regard to the building component.

The study further seeks to establish the validity of:

- three basic requirements on evaluation of buildings
- a model for the analysis of technology transfer
- a model for the analysis of choice of technology
- a model for the analysis of participation
- a modified analytical model for evaluation, originally designed by Nilstun (Edlund 1981).

The discussion of these issues is organized in the following manner:

In chapter two, the scope and nature of construction in developing countries are discussed, be it through domestic or international agencies and companies. This chapter specifically seeks to establish the fact that the most realistic option is to increase the efficiency of the use of available resources.

In chapter three, the current position of development theory is reviewed in relation to the concept of modernization, which might legitimize aid and transfer of technology. A model for the analysis of technology transfer is proposed, and the model is applied to common strategies. The nature of building technology and its distinctive features are discussed. A three-dimensional model is given in support of the analysis of the composition of technology of a building, as well as a model for analysis of participation.

In chapter four, three basic requirements for evaluation of buildings are proposed. An investigation is made on whether or not theory literature on evaluation specifically deals with evaluation of buildings as well as meets the requirements.

The relevancy of a conceptual model for evaluation and corresponding evaluative questions is discussed in relation to evaluation of buildings. Handbooks on evaluation are reviewed with regard to the special requirements of evaluation of buildings as well as case-studies on evaluation of building projects

In chapter five, identified models and analytical frameworks are applied to five selected case study evaluations. Various methodological approaches are tried and discussed. The modified analytical model identified in chapter four is tested in the case studies, along with the models on choice of technology, technology transfer and participation.

In chapter six, the conclusions derived from earlier chapters are summed up and the relation between the identified models is shown. Areas for further research are recommended.

In order to illustrate some central issues of this study, this introduction is terminated by two narratives.

1.2 First Narrative: The Bus

In Lahore, the second-largest city of Pakistan, one can see modern buses manufactured by Volvo. The course of action taken in this case is explained in a publication (Volvo 1979). An analysis of the future expansion of Lahore was made with the help of the company's planners. Enlargement, population, transportation needs, etc have been considered, as well as alternative forms of transport. The analysis results in certain propositions regarding streets, maintenance routines and especially bus routes and schedules. The bus is identical to those seen on the streets in Sweden apart from the altered interior. A special area for women is divided off. Furthermore, the "facade" is suitably painted to adapt to the surroundings.

The export of buses and accompanying transport systems illustrates a form of transfer of western technology. The technique, i.e. the buses, the maintenance systems, the schedules and the calculations of traffic systems are independent of the given locality where transportation is to take place. An adjustment is made to the local conditions through local input data. At the same time, the "lay-out" and the "architectural" style of the bus is adapted.

The introduction of a rational system of public transport in a developing country is presumably a positive aspect. It is not only dealing with a "simple" sale of industrial products, but rather that the seller also undertakes a shaping of the interface of technique for the society; which could be called "technology". The bus manufacturer has presumably exceeding experience from other cities with different types of bus routes, frequency of service, intervals of repair, etc. The bus manufacturer is a specialist in this field.



Figure 1:3 Interior of present bus.

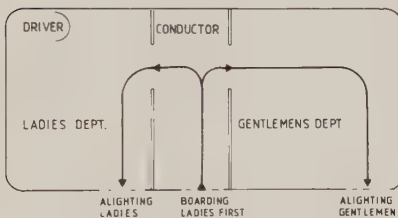


Figure 1:4 Alternative bus interior design.

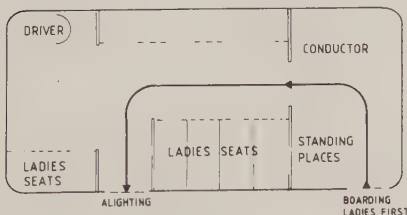


Figure 1:5 Future bus design (Volvo 1979).

From the industrialized country's point of view, the export of transport systems for buses is very attractive. One can say that it is a reflection of industry's definition of "appropriate" technology; the product itself can be taken from the manufacturing line, while adaptation of the product takes place according to the local standard. The system is entirely developed by the industrialized country; it is only to alter the input data. This reportedly successful formula for technological export to developing countries is equally used within the construction branch, but with less successful results. This study seeks to demonstrate, that one reason for this is that a building is the end result of a process, rather than a product.

1.3 Second Narrative: The Bike

Let us instead attempt to view the technology from the outlook of the developing country. One image appears as the following: The place is Bangkok, on the outskirts of a shanty town located next to the highway leading to the international airport. Run-down houses built of left-over lumber, bamboo and rusty corrugated sheet-metal are situated on swampy land.

There are many children and adults. The heat of the afternoon is oppressive and sticky. In one of the more dilapidated houses there is some sort of sale taking place; mostly cold drinks. Fanta.

A motorcycle approaches on a muddy street. It is a Honda, shining brightly, well-polished. An elegant youngster in newly-ironed shirt and black pants is driving. Sunglasses with one-way mirrors. The son of the owner of the bar. He goes in but comes out again immediately, shoves the Honda up on a veranda in front of the house and methodically begins to wipe off the mud. In the colourless and dull environment the motorcycle shines unrealistically. The two round rear-view mirrors are twisted inwards to form a tight-fitting pair in the middle, directly over the head-light. "Presumably so that the mirrors, which are situated at the end of a long staff, will not be damaged while driving in crowded passages", thought the western observer. But if such was the case, the mirrors should be facing forwards when they are folded in. The mirrors are facing backwards, diagonally upwards. They are intentionally placed in this manner. The driver should be able to see himself, with the wind blowing in his hair...

The situation was in some way provocative. That which we saw was neither poverty nor unconsciousness. It was - from a western point of view - a misuse of resources. If he had enough money to buy a Honda, why did he not invest the money in an improvement of his house? Or in his education?



Figure 1:6 The bike; an appropriate choice?

From Honda's point of view the motorcycle is a perfect product. It is beautiful, quick and gives a superior feeling of freedom and escape from reality. It is sufficiently technically-advanced so that few manufacturers would attempt to copy it; especially in the developing countries, and it can be sold almost completely without infra-structures. No special demands for roads, only certain access to spare parts. The product can be sold in almost any country with only very slight adjustments

Is the buyer cheated? From a western point of view the answer is presumably "yes". But what about the Thai youngster's perspective? V.S. Naipul (1964:70, 71) has discussed this problem, based on his own background as an Indian who grew up in West India. In "An Area of Darkness" he mentions how the Englishmen were upset about the bad collective hygiene in India. No sanitary systems, people relieve themselves wherever they please. The country needed water and sewerage.

At the same time he described how the Indians were upset about the bad personal hygiene of the Englishmen. They bath in bathtubs, in the water which they themselves have contaminated, and they eat with the same hand as they....!

My Thai motorcyclist has possibly the same reasoning as V. Naipul's Indians. He has no good experience of society's will and ability to solve the collective problems. Here it is a question of keeping oneself clean. From that viewpoint, he has not been cheated. On the contrary.

It is almost an impossible task to judge what is best for someone else. The problem is not made easier when the judge and the one being judged come from different parts of the world.

2 BUILDING IN DEVELOPING COUNTRIES

2.1 Need for Building

Any attempt to estimate the construction needs of the world is met with a series of problems. The accessible statistics are unreliable in regard to the current situation. The estimations are, of course, even more uncertain. In order to judge the need for construction, a series of normative suppositions must be made. What is the "lowest acceptable standard" in regards to housing or service, and what happens if this standard is not met?

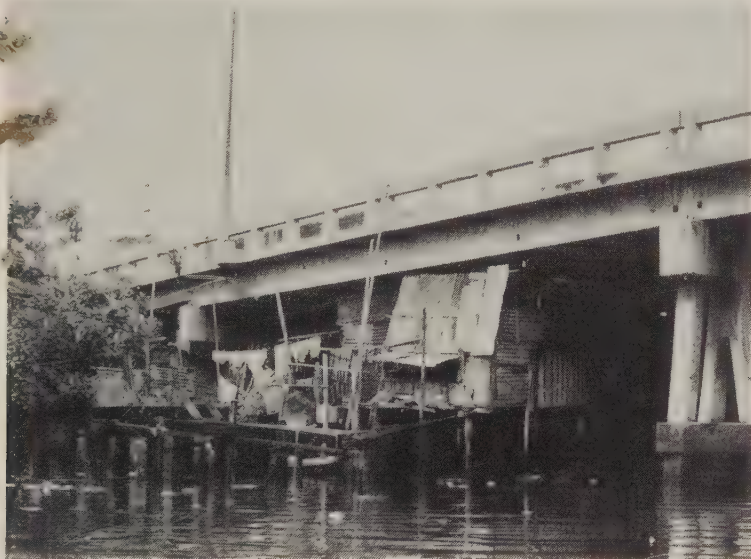


Figure 2:1 Squatter housing in Bangkok, Thailand.

One way to estimate the need for construction is by making the (dubious) assumption that everyone presently has somewhere to live. The need is thus created through the expected increase of population and migration, as well as the need to replace dilapidated buildings. The UN reports (1980:268) that the population of less-developed regions* is expected to increase according to table 2:1.

*The UN defines the category "less-developed regions" as the following: "Including South Asia, East Asia (excluding Japan), Africa, Latin America (excluding Temperate South America), Melanesia, Polynesia and Micronesia."

1970	1980	1990	2000
2,5	3,2	4,0	4,9

Table 2:1 The population of the developing countries according to the UN (1980) in billions.

In other words, the increase of population of the developing countries was 700 million during the 70's, and is expected to go up to 800 and 900 million respectively during the 80's and 90's. The figures ought to be reliable, at least in regards to the 70's and 80's.

The same source furthermore reports the percentage living in, and expected to be living in, cities in less-developed regions.

This is concluded in table 2:2.

1970	1980	1990	2000
0,65 26%	0,97 30%	1,45 36%	2,1 43%

Table 2:2 The population development in the cities of developing countries according to the UN (1980:292) in billions. The percentages regard the urban population from the total population according to table 2:1.

Some conclusions can be made from table 2:2. Firstly, the greater part of the population of the developing countries can be expected to live in rural areas in the foreseeable future. However, the increase of the urban population will presumably be very sharp. This, combined with the difficulties of easily solving the housing matters in urban areas, leads to a threatening development of housing problems, resulting in one of the fatal matters of the coming decades.

The urban population increased in this manner by approximately 300 million during the 70's, and it is expected to increase by an additional 500 million during the 80's. The estimation for the 90's is 650 million. These figures are significant, and in particular indicate the magnitude of the problem. All of these people must, or ought to in any case, have some sort of roof over their head. Furthermore, roads and other infrastructures should be constructed, and schools, health care and other services should be established, such as working premises and administration buildings. The extent of the actual construction activity, solely



Figure 2:2 Mathare Valley, Nairobi, Kenya.

generated by the population, is completely dependent on that which is recognized as "acceptable" standard.

To this it can be added that a large part of the existing buildings in the developing countries is of very bad quality, and in need of constant maintenance.

It is not any exaggeration to state that the construction work expected of humanity during the coming decades is without historical counterpart. The local variations will, however, be very large.

2.2 Role of Building Sector

It is difficult to estimate the value of the on-going construction activity around the world. It includes a whole series of suppositions and conversions, not to speak of convertible and non-convertible currencies. In the middle of the 70's an attempt was made (Turin 1973), based on statistics from 1970. From this, it was estimated that the building activity around the world amounted to a total of 180 billion US\$ in the current monetary value. The portion in the developing countries amounted to 20 billion or 11 %, which can be compared with the fact that approximately 80 % of the population lived in these countries. The developing countries presumably have a greater portion of the construction activity at the present, but this increase has mainly taken place in the so-called oil-producing countries, and possibly the NIC*, i e, some countries in South East Asia and Central and Latin America.

*NIC = Newly Industrialized Countries, e g Mexico, South Korea, Taiwan, Malaysia.

This low portion of total construction activity which thus takes place in the developing countries should not lead one to believe that the construction activity constitutes a less important portion of the economy of the developing countries. To take a typical figure, the United Nations (1980) indicates that 40 %-60 % of the gross fixed capital formation in the developing countries (as in the industrialized countries) goes to this sector. Just under one half of this investment is intended for housing construction. Furthermore, Turin (1973:34) states that the construction activity comprises approximately 4 % of the GDP* in countries with a low per capita GDP. This increases to approximately 8 % in countries with a high GDP. Looking at figure 2:3, it is clear that the greatest rate of increase is found in the intermediate range.

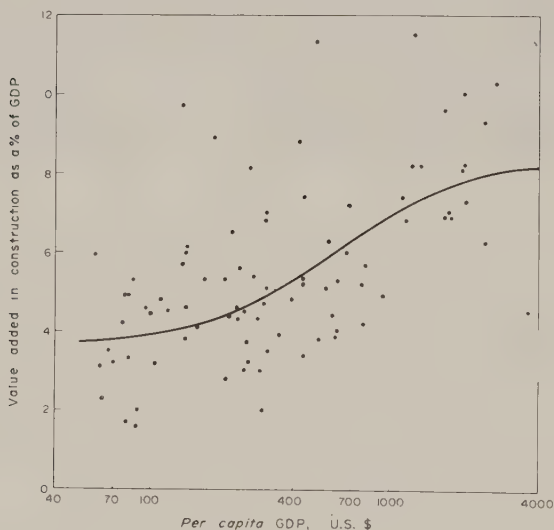


Figure 2:3 Relation between value added in construction as % of GDP and per capita GDP (Turin (1973:34)).

Turin notes that "if the observed relationship was not only valid between countries at a fixed point in time but also within a country over time, it would imply that the GDP elasticity of construction should be highest within the same range". Turin considers this to be the case and also states that "this means that the value added in construction per capita, as shown in figure 2:3, and that at both extremes of the slope of the relationship, is approximately one...".

*GDP = Gross Domestic Product

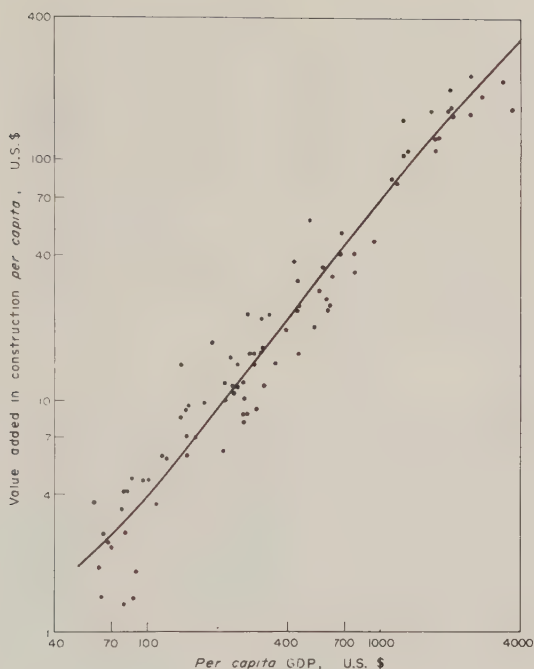


Figure 2:4 Relation added in construction per capita and per capita GDP (Turin 1973:35).

However, Turin cautions against a mechanical interpretation in association to this: "To the extent to which the economic growth is related to the level and efficiency of capital formation, the former is therefore linked, albeit indirectly, to the capacity of the construction sector. In other words the statistics analyzed... show that construction can grow faster than GDP, and probably that it should. However, if it fails to do so, construction capacity may become a serious constraint to a sustained capital investment programme, whether financed from home resources or from international or bilateral sources" (ibid:41).

The statistics of the UN are, however, based on information submitted by the countries themselves. In many cases, this information is insufficient. It refers only to construction enabled to be entitled "formal", i.e. carried out according to valid norms and regulations and with the help of contractors or the equivalent. The figures for industrialized countries almost exactly correspond to the actual construction, where spontaneous or "informal" construction almost never occur. This functions in the opposite manner in most of the developing countries. For example, it has been calculated that 90 % of the housing in Tanzania is built complete-

ly on an informal basis, and therefore, is not accounted for in the statistics. This is calculated by the number of units. It is more difficult to estimate the value of this spontaneous and extensive construction activity in figures. It is certainly of vital importance for the economy of many families, especially when the durability of the building is limited. In many of the developing countries, 7 years is thought to be an average life term for basic housing accommodation. According to the statistics of the UN, 42 % of the investments in Tanzania go to the building sector. This corresponds to 6,2 billion Shillings. The value of the informal building has been estimated at approximately 1,5 billion Shillings over and above that accounted for in the statistics.



Figure 2:5 In the Dandora housing scheme, formal housing is too costly for the target group (Nairobi, Kenya).

With this, the portion of the total investments in construction increases sharply. How much of the investments, and thereby of the GDP, which in reality ought to be related to building and construction activity is difficult to estimate unless a comparative examination is done for the importance of the informal activity for other sectors also.

The relationship between the extent of construction activity within the so-called formal and informal sectors in regard to the economy of the country can be illustrated diagrammatically. The formal sector is thus defined as that being noted in the official statistics, and the informal sector as the remainder. Furthermore, the proportion is measured in the building surface or possibly volume, without qualitative consideration. See figure 2:6.

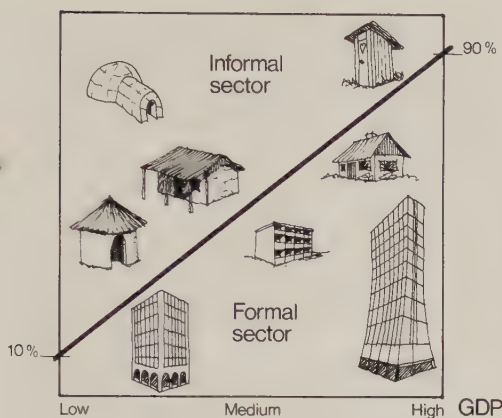


Figure 2:6 The portion of informal construction activity in comparison to the economy of the country.

It may be discussed whether or not the connection is as straight-forward as the figure simply states. Within the more wealthy countries, there is presently an indication that the importance of the informal sector is on the increase.

The conclusion of this examination of the role of the building sector, especially in the economy of developing countries, is to some extent discouraging. At present, the sector already absorbs such a large portion of available resources for investment that it is not realistic to think that this portion could possibly be increased to any considerable extent. Construction activity, however, seems to increase if the economy of the developing country is improved. Unfortunately, few of the poor states are presently experiencing such an economic growth.

Thus, the remaining alternative is to increase the efficiency and the functional utility of the investments made for the future within the limited frame.

2.3 Role of Expatriate Companies

An extensive activity in developing countries is carried on by construction companies having their base in industrialized countries. With the stagnating domestic market in many western countries during the 70's, architects, engineers, building project managers and contractors have turned their interest to the developing countries' market. The stagnation can be shown in table 2:3.

Country	Investments in building and construction activity in % of GDP		
	1958/69	1967/69	1976/78
Sweden	15,0	16,5	12,0
West Germany	13,4	13,7	12,7
Holland	12,0	14,9	12,3
France	11,1	14,4	13,6
Great Britain	6,4	9,8	9,6

Table 2:3 Investments in the building and construction sector in some countries, in % of GDP (Drewer 1982/A:46).

A French study has reviewed the international activity of the European construction industry. According to a report from the Swedish Embassy in Paris (1981), the study states that "after having increased the export value of the European BTP* industry by five times from 1973 to 1977, it has experienced a retrogression of 10 % in 1978 and 15 % to 20 % in 1979 in volume and nearly 8 % in value." During the coming years it is expected that the market value will decrease slightly, and that the competition from the NIC will grow at the same time that these countries begin to dominate their "own zones"; Korea and Taiwan in Asia, Brasil and Mexico in South America. The home markets for the European construction industry, however, are expected to decrease even quicker. Therefore, the international activity will increase in relative importance for the industry. According to table 2:4 the extent of construction activity for five key countries is given on an international basis.

Country	Construction Activity Abroad, Billion FFr			
	1973	1978	1979 (estimated)	1973-78
Sweden	0,35	2,50	3,41	10,50
Germany, Federal	1,95	24,05	22,40	69,90
Republic of				
Netherlands	2,60	14,50	16,95	52,60
France	8,65	30,95	27,00	121,00
United Kingdom	3,70	14,45	11,75	55,50
TOTAL	16,90	83,95	78,10	299,00

Table 2:4 The extent of activity abroad within the construction industry for four European countries. The figures are given in billion FFr, current price. (Sw. Embassy, 1981, and information from the Swedish Building Contractors' Union, 1981).

*BTP = Building and Public Works

The export value of the Swedish construction industry (including contractors and consultants) to Europe, North America and Japan constitutes only approximately 15 % of the export to developing countries, and the same proportion exists for the countries referred to in table 2:4. Even if the figures are not exact, they are comparable on the whole. The Swedish construction activity in developing countries has increased sharply during this period, but it is still limited when compared with the construction export from other European countries. A large portion of construction in developing countries has referred to buildings and infra-structural works in modern technology for the so-called oil-producing countries.

A special study of the activity in developing countries of Swedish consultants shows that it has expanded greatly during the actual period and reached approximately 500 million SEK in 1979. However, consultant export is dominated by very few companies, one of which is very prominent even when compared on an international basis. The activity of the consultants in developing countries also refers to the so-called oil-producing countries to a large extent. Through capital profit, these countries have been able to buy both goods and services from the "modern" section.

2.4 Role of Aid

The construction activity in the developing countries, including the financially strong oil-producing countries and the NIC, often takes place through financing, which in some way is subsidized. This can imply everything from "soft" credits and loans from the World Bank, to free bilateral aid.

It is possible to interpret the official statistics as if construction activity comprised an insignificant part of the aid. The World Bank (1975:56) informs that housing, building and planning absorb between 0.001 % (Japan) and 2.5 % (USA, Belgium) of the aid, both bilaterally and multilaterally. Regarding the Swedish aid, it can be stated that housing and construction activity has been lacking their own divisions within the aid organization SIDA*. Instead, the matters are dealt with through an informal building group within the Industry Division. A typical figure for the construction activity, taken from SIDA's statistics, is given as 2 % (SIDA 1978, and SOU 1977:13:390) or approximately 47 million SEK

This could give the impression that construction activity plays an inferior role in international aid to the poorest countries.

Accordingly, the sector also appears to indirectly be of inferior importance in endeavours of development in the developing countries since the aid is intended to

*Swedish International Development Authority

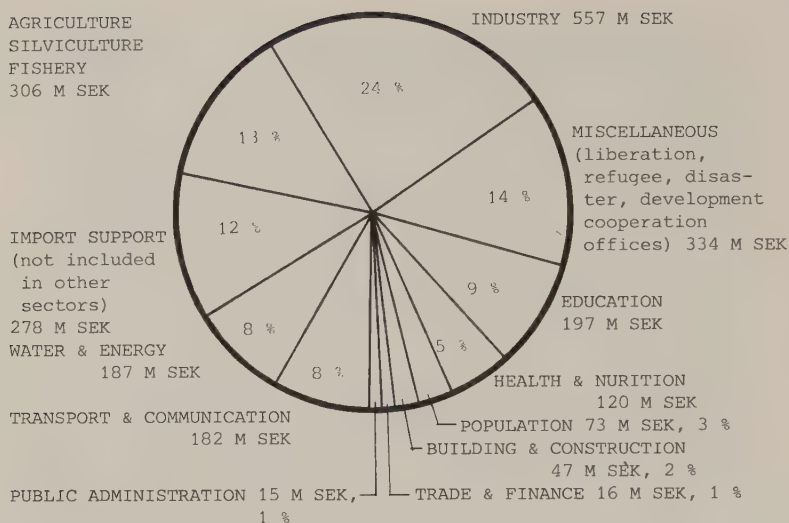


Figure 2:7 Aid through SIDA divided into activity areas. Disbursements for 1977/1978.

lead to "increasing resources, economic and social compensation, economic and political independence and a democratic development of society " (SOU 1977:13:38).

If only a fraction of the aid is used for construction activity, it cannot be of much importance in attaining the essential goal of development!

A closer examination of the statistics points in the opposite direction. SIDA has, in an internal study, been able to show, that an important part of the bilateral aid is used for construction under the headings of Forestry Projects, Health Projects, Education Projects, Rural Development Projects etc.

Andersson (1978) states that there were 304 projects in the project list at that time. These were distributed amongst 22 countries, as well as the East African Community existing at that time. The total sum of these projects is calculated as being 6,7 billion SEK. Out of these 304 projects, 92 comprised a construction component. The sum of these 92 projects amounted to 3,6 billion SEK, or 54 % of the total sum. This means that a construction component exists, as a rule, in the larger, more costly projects, while many small projects lack a construction component.

The total cost of Building and Public Works amounted to 2,6 billion SEK, constituting 38 % of the total cost for all the projects, or 71 % (!) of the cost for the 92 projects having any sort of construction component on the whole. Thus, construction activity often absorbs

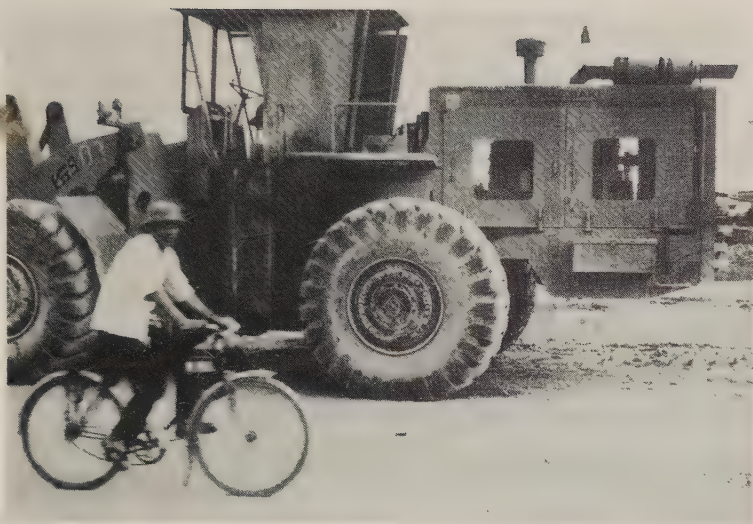


Figure 2:8 Construction constitutes a major part of many bilateral aid projects (Bai Bang, Vietnam).

the greater part of the resources in the major projects.

The quoted study has only analyzed the Swedish bilateral aid. There is, however, no reason to presume that the construction component should not absorb a substantial part of other countries' bilateral aid, and equally of the aid supplied through the UN and other international organs on multilateral bases. In practice, the construction activities are given high priority by the developing countries as necessary means in order to create (physical) conditions for other, more socially aimed activities.

An explanation for the fact that the construction sector is not "visible" in the official statistics could be that the policy of aid has been broadened from "the project/sector way of thinking to, instead, country programming" (SOU 1977:13:37).

Resources have, in increasing proportions, been conveyed with less-defined end results to the development programmes which the receiving country carries out within different regions. This encourages wide-range problem-oriented programmes where more specialized, narrow interests for the sector can be balanced.

As shown in chapter 2.2, construction activity comprises approximately one-half of the investments in the

developing countries. Therefore, it is natural to assume that activity which is partially financed through aid or through international subventions consists, in some form, of a comparative portion of construction activity, provided that the resources are used for investments (fixed capital formation). There is good reason to assume that these circumstances will remain.

Investment projects often answer for an obvious and measurable demand for resources in the form of buildings, factory premises, machines, etc, which are necessary in order that the developing country is able to carry on with the desired activity. In this way, construction projects in aid-financed programmes are often a necessary, albeit far from sufficient, prerequisite in reaching the goal of the programme. Turin (1973:43) has implied that sometimes there are "less justifiable reasons lying behind the building projects, among which the author often suspects the ever-present attraction of a criterion which, for a lack of a better word, could be called inaugurability...".

2.5 Market Penetration

The construction activity in developing countries which is financed completely or partially through the means of aid leads by no means always to contracts for contractors or consultants from industrialized countries. Furthermore, the volume of aid is not so great that the market can be compared with the capital excess in the oil-producing countries, nor with the market generated by the international credit market in the developing countries. In spite of this, the construction activity generated through aid can be worth a closer study. A major reason for this is that many consultants enter the international market through aid activity from their own country.

Drewer has studied the activity in developing countries by the Swedish consultants (1982/A:18). He states that "the route of entry of Swedish consultant engineers into work in developing countries is similar to that of their architectural colleagues." However, the consultants soon set themselves free and "once established with a recognized "third world" competence, they move into their main areas of domestic expertise; water supply, sewerage schemes, hydro electric facilities, etc. But entry into a new country is frequently through the vehicle of a SIDA-funded study." What Drewer implies here is that SIDA places certain demands on the consultants in regards to disinterestedness, multi-disciplinaryness and a broad manner of attack, which other employers do not demand. Furthermore, he states that building management consultants as well come into the market for developing countries through Swedish aid but also that they "tend to move in the "slip stream" of Swedish industrialized companies".

To a certain extent, this functions differently with the Swedish contractors. They operate in developing

countries throughout the world. The contractors are not usually dependent on Swedish aid in the same direct way in order to come into a market. Drewer found it, however, "interesting to note six main factors which were claimed - by one contractor - to define their marketing stance:

- A Swedish company
- Swedish foreign policy
- Swedish aid policy
- Completion on time to a high standard
- Swedish reputation for quality, and helpful aid of the local Swedish embassy" (Ibid:19).

The company thus meant that even if it did not directly get an assignment, the aid was "good will" which created an argument in the marketing. Moreover, the company could take advantage of the fact that the Swedish Embassy personnel "knew" the actual country. In the countries receiving Swedish aid, the embassy is without exception strengthened with an aid office.

Hereby, as well as through aid projects, the embassy possesses thorough knowledge of the country in question. With this, the aid can be said to assist in compensating Sweden's lack of knowledge, which the absence of a colonial past has brought about. Other countries can be expected to derive comparative advantage from their bilateral aid.

The activity in developing countries of consultants based in industrialized countries has also another function, the so-called "spear-head effect". Ström, from the Swedish Employers' Confederation, says (1982:4): "On the international market, the consultants are the spear-head. The result of their work is often a benefit to Swedish companies which strengthens the Swedish economy and creates employment. The consultants are not always credited for their contributions. Their important role is underestimated. In practice, it is often the consultants who initiate the large Swedish projects on the international market. If a Swedish consultant firm carries out the pilot study for, for example, an industrial complex or designs development plans of another type, a Swedish contractor has greater possibilities of entering the same market."

Sölwell discussed "the spear-head effect" in an essay (1979:35). He points out that "since the consultant functions mainly as an advisor to his client, it is important that the consultant can work freely from the industry". Sölwell states that there are not any formal connections between Swedish consultants and Swedish industry. However, he finds "six important factors which point out that Swedish consultants form a spear-head for Swedish industry on the international market."

The factors were summarized as the following:

- A Swedish technical frame of reference is transmitted. This can refer to Swedish building norms, Swedish system solutions etc.
- The consultant often has the task of recommending for the client those allowed to participate in the tender competition, and thus recommends, as a rule, at least one Swedish company. If the consultant later has the task of participating in the evaluation of the tenders, he can also favor the Swedish tender, since this tender has the best prerequisites to conform with the technical specifications according to the preceding point.
- The consultant specifies equipment, material etc. A trademark with the insertion "or approved equivalent" is often specified for usage. If the trademark in question is Swedish, which is quite normal, it is the responsibility of the contractor to see to it that other trademarks meet the same standards. It often occurs that the contractor avoids going to this trouble.
- The consultant can give hints and informal contacts to those he knows. Existing personal connections between the consultant and the industry's employees are an advantage for their own country's industry.
- Swedish industry and quality becomes known through the consultant. The Swedish industry quite often overestimates its international renown. By giving an account of Sweden in his marketing the consultant spreads knowledge of the country, the industry and the technology.
- The client has the advantage that both the consultant and the contractor come from the same country. The communication between them can thus be expected to function more efficiently, and it can be easier for the consultant to review the designs proposed by the contractor.

There is no reason to suppose that consultants from other industrialized countries should not have the same market-preparatory function in regards to their own country's contractors, building material producers and engineering industry.

3 TRANSFER OF BUILDING TECHNOLOGY

3.1 Two Examples

Two concrete examples of "transfer of technology" will be given here in order to illustrate the thoughts expanded upon later in this chapter. The first example is taken from the Swedish-Vietnamese development cooperation and concerns geo-technical research:*

Just north of the city centre in Hanoi, two hospitals have been built during the 70's. One of them is a children's hospital built with Swedish aid, and the other is a women's hospital which has received similar support from the Soviet Union.

Experiences gained from these two building projects gave rise to Vietnam's application for research cooperation with Sweden within the branch of geo-technology. The Vietnamese geo-technologists have stated that the main buildings of both of the hospitals have generally the same height, surface area and weight, and therefore, cause similar strains on the equally weak and clay-like subsoil. The piling under the children's hospital has been gauged by Swedish geo-technologists who did not establish a pile-plan until a later phase, after field tests with simple equipment and after test planting the piles in their place.

Piling for the women's hospital has been gauged with the help of the Soviet norms, and the field methods have been markedly more complicated than for the neighboring hospital, even though test piling had not been undertaken. The interest of the Vietnamese geo-technologists for the Swedish geo-technology was aroused by the fact that the Swedish engineers ordered shorter, more slender and fewer piles than required by the Soviet norms. The cement and reinforcement bars for the foundation of the children's hospital were only about half as much as for the women's hospital. Generally, Vietnam applies the Soviet norms. Therefore, it would mean large savings if these could be revised according to the Swedish norms.

In 1976 Vietnam had the opportunity to send a building research delegation to Sweden. The programme in Sweden was comprehensive and mostly all parts of the building sector were studied.

The visit concretely resulted in the provision of a so-called lime column machine, among other things, to the Ministry of Construction through aid from SIDA. This machine is intended for use when clay requires stabilization. With the help of a "beater" the lime is mixed in with the clay and forms stabilizing "columns" in the

*Description based on personal first-hand information, and Andersson 1978, Broms 1980, Bengtsson 1976, Hansbo 1979, Lundbom 1978, Reuterswård 1977 and 80/C.



Figure 3:1 A Swedish-made lime column machine was procured by Vietnam.

ground. These also function as vertical drainage and thereby have the charactersitic that they accelerate the consolidation process in the ground. The method is neither uncomplicated nor of universal application. It requires special conditions and competence during the application. The lime column method is newly-developed and has not been tested very much. It is not suitable for heavy stress from, for example, high-rise buildings, where conventional piling is more preferable.

A renewed discussion on the possibilities of establishing research cooperation within the geo-technical branch between Sweden and Vietnam was taken up parallel to the provision of the machinery. In 1978 Vietnam proposed testing programmes which were directly associated to the machine. In Vietnam, geo-technical research was divided into three institutes:

- One institute within the Ministry of Construction having reference to geo-technical problems of, e g high-rise buildings (recipient of the machinery).
- A second institute located at the Ministry of Hydrology having reference to geo-technical problems of dam construction and terrace design.

- A third institute within the Ministry of Transport where the geo-technical research applies to matters dealing with the construction of roads and road embankments.

The Swedish geo-technologists were critical of the strong concentration of the Vietnamese research on methods, and recommended that the research cooperation should be focused on problems and that the provided machinery and the associated method should be viewed in their context. Furthermore, it was recommended that under these circumstances the machine should be transferred to the second or the third institute since the lime column method is not suitable for foundations of high-rise buildings.

A programme for cooperation was drawn up. Many institutes participated on the Swedish side. Thus, one was insured of a wide and varied competence which could participate, depending on the research problem in question. On the Vietnamese side, the project remained at the institute which had the machinery.

The cooperation was commenced in 1979 with mutual research visits and an extensive programme for research education of Vietnamese researchers in Sweden. After storing in at the harbour, the machine was brought up to the institute in Hanoi. At that time it was in bad condition, and extensive repairs were necessary. On several occasions SIDA urged that Vietnam ought to use a portion of the repair fund which is included in the Swedish aid, but no request was made. During this time, the research education and the exchange of researchers was able to continue. The Swedish problem-orientated approach towards the use of the method, and its limitations was gradually accepted by researchers directly involved.

The project is still in progress, and it is therefore not possible to draw any definite conclusions. However, in 1983 an evaluation mission was commissioned by SAREC. It was found, that the machine had been repaired, but that it had never been in use for the research and that it was not quite in operating order. On the other hand, the research training of Vietnamese engineers had evidently been carried out successfully. They mastered the method well, and the intended use had been altered to low-rise buildings, roads and banks. But there was more to be shown. This understanding had been used to adapt the method to standard drilling equipment, already in existence in Vietnam. At several sites, test lime columns were being made according to this new formula.

In this case, it is unlikely that the Swedish-made lime column machine will be of any significant use to Vietnam. The theories and the science connected to the technique have, however, been absorbed by Vietnamese researchers and adapted to local conditions and locally

available equipment. Thus, this could be said to be a promising example of technology transfer.

The second example is taken from the development co-operation provided by the COMECON-states for Vietnam. It concerns technology transfer in the form of factories for the production of large concrete panels used in housing construction. The technique as such is well known and the output can be seen in the suburbs of any major East European city. Basically, the same technique has also been used in West Europe, particularly during the sixties and the early seventies. In retrospect, this technique has not proved to be very successful and at present all sorts of social and technical problems are associated with the large-scale application of large panels for housing. Moreover, in Sweden the economy of these systems has proved to be inferior to more "traditional" techniques.

Several factories for large concrete panels have been given to Vietnam. The theoretical production capacity of the commissioned factories is rather impressive, some 2 600 flats/year, but the actual production is far less:

Factory	Prod.cap.	Prod.-82	Planned prod.-84	misc.
Uong Bi	600	0	?	
Dao Tu/Vinh Y	800	200	10 000	m2
Xuan Mai	1 200	limited	25 000	m2
Chem	2 400	-	10 000	m2 not yet commissioned

Table 3:1 Large-panel factories in northern Vietnam (source: Ministry of Construction, Hanoi 1983).

Why has the production of these factories been so meager? The production technique in itself is well tested and rather unsophisticated, and some of the factories have been operational for as long as ten years. One reason could, of course, be that the buildings have proved to be less well-adapted to Vietnamese living conditions and especially to the climate. Another reason could be the cost. One square meter of useful area, corresponding to two square metre of constructed area, costs about 8 000 dongs. This is twice the cost of building in a more conventional technique, e g bricks.

The major reasons for the shortcomings are, however, to be found outside the factory and its finished buildings. The Vietnamese society has great problems in providing the necessary quantities and qualities of building materials. The technique is not adapted to locally available natural resources. Moreover, the transport of the finished panels has proved to be almost impossible, due to the weak transport infrastructure of the country. Large building cranes are in short supply at the sites.



Figure 3:2 High-rise buildings in an international style seem to be attractive, for questionable reasons (Giang Vo, Hanoi, Vietnam).

This is an example of technology transfer, where the project from the donor side could be said to be neat, well-defined and positively "inaugurable", but where the use of the aid puts heavy demands on the receiver. The technology "hardware" has been transferred to Vietnam, but not integrated into the Vietnamese building sector.

Thus, technology transfer cannot only imply the transfer of a technique, but must also be adapted to local environmental factors. These factors will be discussed in the following sections of this chapter.

3.2 Development Theory

Development theories have, as a rule, been developed by economists, sociologists, anthropologists and other social scientists. The subject of this study is, however, of a more technical nature, and deals rather with concrete matters of choice of technique for construction activity. In this way I approach the development theory from my point and search for a framework for the strategies I wish to deal with. The development theorists must, therefore, excuse me if I slightly simplify the theories in order to make them applicable within my branch.

In a recent report, Hettne has dealt with the subject "Development Theory and the Third world" (1982). He begins by stating that it is "appropriate to start with the problem of definition, even if the reader may feel frightened of the thought of another definition of a

clearly overdefined phenomenon. My intention is however, not to suggest new definitions but to stress what I feel is an important point: there can be no fixed and final definition of development, merely suggestions of what development should imply in particular contexts" (ibid:7).



Figure 3:3 Development; a traditional rural village with one new building (Cao Bang province, Vietnam).

Development, or to use a more neutral word, change, of a society or a trade in a country cannot follow any well-beaten track. The world market, the balance of power and the available knowledge has changed so much that development today occurs on specific terms. In spite of this, there is a sort of strong attraction for some form of linear development model. Hettne states that

"in spite of the increasing complexity of development theory as it grew more interdisciplinary, it is still possible to distinguish in the new approaches the same basic evolutionary framework... most commonly referred to as the modernization paradigm. Development was seen in an evolutionary perspective, and the state of underdevelopment defined in terms of observable differences between rich and poor nations. Development implied the bridging of these gaps by means of an imitative process, in which the less developed countries gradually assumed the qualities of the industrialized nations " (ibid:29).

He notes that many have interpreted the concept "modernization" in considerably varied ways. It is, however "the existence of the ... approach where development is an endogenous process, realizing the potential inherent in more or less embryonic form in all societies, depending on their level of social development, which makes it possible to talk about a paradigm" (ibid:29).

A well-known economist, W. Rostow, contributed with a theory, which according to Hettne "conceived of development as a number of stages linking a state of tradition with what Rostow called "maturity". This development was analyzed primarily as an endogenous process... There were five stages through which all societies had to pass:

1. The traditional society
2. The pre-take-off stage
3. Take-off
4. The road to maturity
5. The mass consumption society" (ibid:31).

Rostow completely unsentimentally means that many characteristics of the traditional society must be excluded in the earlier stages, before "take-off" can take place.

Hettne says that "the most characteristic sign of the take-off stage is that the share of net investment and saving in national income rises from five to ten percent or more...". This reasoning agrees with the discussion in chapter 2:2 and figure 2:3. Rostow saw his theory as an alternative to the Marxist theory, but the key element in his thinking is nevertheless the process of capital formation.

The concept that technical and material bases must be accumulated before a subsequent development stage can be reached, is thus common for Marx and Rostow.

Warren, who is designated as a representative for neo-classical Marxism, says for example, that "the fact is that the West did not industrialize while the rest of the world stood still, nor did industrialization retard the development of the rest of the world. Rather, the industrialization of the West from the late eighteenth century onwards (especially from the mid nineteenth century for most countries other than Britain) tended to initiate and then accelerate modern development in the rest of the world, which otherwise would have remained comparatively stagnant. Western economic expansion aroused the non-Western world to a modernization process for which its own internal development had not yet prepared it" (Warren 1980:113-114).

In all essentials this is in line with Rostow, who means that "international relations do, in fact, speed

up the process of development, but have little to do with under-development" (Hettne 1982:31).

The alternative to the modernization paradigm is, par preference, the so-called dependency school. Its death has, however, already been declared on a sufficient number of occasions so that we should be able to pass by it in this context without closer discussion. In any case, it has shown itself to be exceptionally difficult to combine with international cooperation and mutual assistance politics. Hettne instead asks himself, "What happened with the modernization paradigm?" He states that it has been markedly developed since the 50's.

"The naivite of the early formulations of the paradigm is eliminated and much of the criticism is acknowledged. Rather than abandoning the approach altogether one has started to "rethink modernization". This is done by looking on modernization as a historical process of Westernization. This view is not teleological, but the process of modernization is instead seen simply as a consequence of the comparative strength of Western civilization during a certain historical period. As it turns out that even the "great alternative", China, has put modernization (or even "four modernizations") on the development agenda, one should not be surprised if modernization (if not exactly the modernization paradigm of the 50's) becomes a key concept in development theory during the 80's" (ibid:38).

Our aim here has been to demonstrate some central ideas cherished by current development theory. It can be stated that behind every form of transfer of technology there is the idea that the industrially advanced countries have knowledge and/or equipment which could simplify the development and modernization of the most poor countries.

Moreover, it can be stated that the same idea has been of central importance for the origin of the discussed geo-technical cooperation between Sweden and Vietnam, and presumably for the large concrete panel factories as well (see chapter 3.1).

Transfer of technology from one country to another or from one era to another can be called "the horizontal dimension of the transfer of technology" (Brooks 1967:5').

3.3 Technique and Society

Industrialism's initial stages, break-through and maturity in (principally) West Europe and North America during the 18th-, 19th- and 20th-centuries constitute a well-documented historical event. During this period, these societies have certainly been revolutionized in

the technical, economical and social senses. This transformation has occurred without voluntary "aid" from the surrounding world. The colonial system, without doubt, helped the prospective industrialized countries with the important accumulation of capital, but this took place against the will of those colonized.

At present, there is little remaining of that which at one time was "local" culture and living patterns in the industrialized countries. Almost everyone has become a wage worker and has settled in the densely-populated areas. This transformation has substantially neither been chosen nor directed. Totally seen, no form of strategy at all has guided the development. The technology has been developed through qualitative bounds (technical and administrative innovations) and through quantitative growth (adjustment to general use).



Figure 3:4 Development? A vernacular and a new building (Osby, Sweden).

This sensitive game between available technique and its demands on certain social conditions has been discussed by Edquist and Edqvist (1980). According to them, technique demands certain social conditions in order to be transformed from technique in a foreign environment to technology; to be integrated and become a part of the society.

Thus, it's not sufficient with the more limited definition of technology which, for example, Nörlund and Muller propose (1980:110). According to them technology is comprised of four elements: i.e., knowledge, technique, organization and product. In the history of technique there are many examples showing that good technique was forgotten, depending on the fact that the necessary social conditions were dissolved.

A very clear example of this is provided by the building material concrete (Guedes 1979). Concrete is usually thought to have been discovered by the romans who revolutionized their construction activity with the new material. However, concrete-like material had been used earlier in places where the necessary raw materials existed in a natural way as, for example, in Greece.

In 199 BC the harbour in Putoli was built with concrete which had the good quality that it could set under water. During the following century, concrete became a general and well-tested construction material. Walls, bridges and aqueducts were built and in the end, wood, stone and brick could be completely eliminated as "structural members". Rome was devastated by a great fire in 64 AD and thereafter, the authorities issued strict rules for the manner in which buildings should be executed in order to prevent a repetition of the fire. They were to be structurally independent of each other, and the possibility to use inflammable material was restricted. This intervention by the authorities finally (one could believe) broke down any remaining opposition to the new material. Possibly the most renowned example of grandiose concrete architecture is represented by the Pantheon, which was built between 118-128 AD. The use of concrete continued on a large scale until the end of the Roman Empire. Parts of St. Sophia in Constantinople were built, for example, in concrete around 540 AD.

However, during the following centuries the use of concrete died out, except in a few isolated places where the technique was transferred from father to son.

Vitruvius had, however, already described the characteristics and composition of concrete in detail in his famous books around 27 AD. These were rediscovered in the 15th century and were republished. During the following centuries some experiments were made, but the material was not used again until the 19th century. Near the end of this century, the knowledge of steel reinforcement was developed, and the success of the combination of these two materials is only too well-known.

Technique thus requires that the society is "mature" in order that the technique can be integrated and vulgarized. This transfer of technique within a society from available knowledge to practical and general use has been entitled "the vertical dimension of the transfer of technology" (Brooks 1967:54).

3.4 The Concept Transfer

Each transfer of technology consists of either one or both of the vertical and horizontal dimensions. This can be illustrated diagrammatically according to figure 3:5.

An existing practice might develop, through research and related theoretical work, to a new practice, which in turn is developed through research, and so on. If a technique, in practical use in a society, is transferred to another society, it might lead to a theoretical understanding of this technique, and also to a development of it. Hereby, a better adapted or more efficient technique might come into use, which in turn is further developed through research. There is a continuous shift between the theory level and the practical use level. Thus, the basic stages of technology transfer might be, and are, combined in all imaginable ways and in many steps, if the process is studied over a more extended period of time.

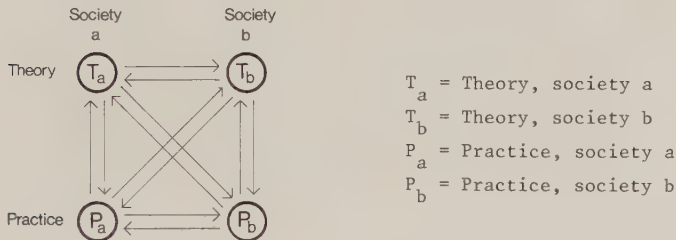


Figure 3:5 Dimensions of technology transfer.

For our purposes here, it will be sufficient to consider technology transfer in two steps, that is, the initial step of transfer and the successive integration into the other level of the receiving country.

With the support of, among others, Raz (1979), three main strategies can be identified:

1. The first strategy implies that the country invests in developing an "indigenous" technique, often with the motivation that the existing technique is developed by capitalistic states, and that the technique can't be taken over without the political system which has been the technique's bosom. An advocate of this approach is Amin (1976). Over and above the leading industrialized countries which have spontaneously followed this strategy, it is supposedly China which, during the so-called cultural revolution, has made the most extensive attempt to follow the strategy (T_a→P_a→T'_a)



Figure 3:6 First strategy; vertical transfer of technology.

2. The second strategy implies that technique which is inexpensive to attain, tested and easily acquired, would be possible to continually develop and in the long run eventually surpass the original. This could possibly take place under the cover of the new hosting country's comparative advantages such as, for example, lower wage expenses, access to a protected market or primary produce. There are several examples showing that this strategy has been successful in modern times. Japan followed it consistently within the branch of electronics during the 50's. A possibly less-successful example could be given by Soviet Union's take-over of a discarded car model from Fiat. In this case the technique appears to have been able to be used successfully but it is more uncertain if it has been able to be developed within the new hosting country ($P_a \rightarrow P_b \rightarrow T_b$).

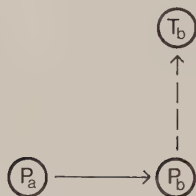


Figure 3:7 Second strategy; initial horizontal transfer and subsequent vertical integration

3. The third strategy implies import of current technique and education, in this way aiming at modernizing an undeveloped industrial branch. There are many examples where this strategy has been applied, for example, within the areas of space research and communications. The states surrounding the Persian Gulf and China (during the recent years) have often chosen this strategy, also within other branches ($T_a \rightarrow P_b \rightarrow T_b$).

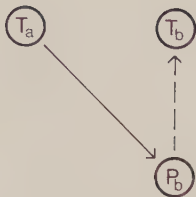


Figure 3:8 Third strategy; peak technology transferred initially, and subsequently integrated vertically.

If the cited example regarding geo-technology in Vietnam should be analyzed in regards to three strategy alternatives, the following is found. The Vietnamese government authorities have accepted that the country lacks possibilities of rediscovering, on a large scale, an individual technology in accordance with the first strategy alternative (Bjerninger & Jansson 1978:41). It remains to choose between technique "getting on in years" (alt. no 2) or current technique (alt. no 3). In this context alternative 2 had, for example, meant that an investment had been made to take part in those methods and techniques for calculations and piling which are well investigated for Swedish conditions, but which nonetheless would demand R&D investments for the application. The ground conditions and types of soil are special in Vietnam, as well as the accessible field equipment and - especially - the personnel. This took place also, since Vietnam had taken part in the Swedish norms for point-bearing piles. Certain studies and attempts have since been carried out by the Ministry of Construction in Hanoi with the aim of adapting and further developing these norms for Vietnamese application.

Initially the lime column project followed the third strategy ($T_a \rightarrow P_b \rightarrow T_b$). The main cooperation project implies, however, that a closely-related variation of the third strategy was made use of ($T_a \rightarrow T_b \rightarrow P_b$) since research was made on the so-called lime column method. This choice was consistent with the technology politics expressed by the country (Wetterberg (1977:8).

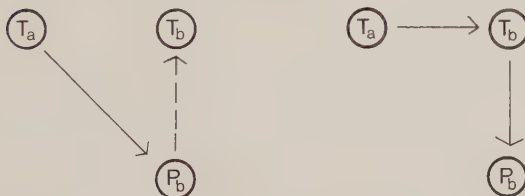


Figure 3:9 In the lime column project, the transfer of the advanced machine, was not enough to achieve a vertical integration. For this, research cooperation was necessary ($T_a \rightarrow T_b \rightarrow P_b$).

General Vo Nguyen Giap discussed these matters at a conference for technical-scientific cooperation in 1976. He stated that the technical-scientific development of the country ought to take place with the help of "two legs". The traditional technique, the one "leg", is important in the short-term perspective. Giap, however, considers this technique well-known within the country and well-tested for the domestic conditions there. Help is not needed from (West) Europe for this. The other "leg" implies that there is a desire to develop a modern industrial sector. In order for this to be carried out, Vietnam must quickly absorb the current science and technique. Giap's conclusion is that the country should, in its contact with a country such as Sweden, firstly attempt to absorb that which could be called "peak technology". This policy seems to have been maintained, even if the selective aspect now seems to be more stressed. In a resolution of the Political Bureau of the Communist Party of Vietnam on the Party's policy concerning science and technology, it was said, according to a summary in Vietnam Courier no 8/1981:

"It is necessary to prove the superiority of socialism in dealing with our cultural legacy and in developing on a scientific basis, the nation's scientific assets and experience in production. At the same time, great importance should be attached to the selective and creative assimilation of the achievement of modern science and technology throughout the world.

It is necessary to give priority to the development of some scientific and technological fields of major importance for economic, cultural and social development, for the development of the scientific and technological potential of the country, with due attention being given to the main trends of scientific and technological development in the world" (ibid:13,14).

The resolution, more extensively quoted in Vietnamese Studies no 29/67, stresses the transfer of modern technology through research (cooperation) and its adaptation to the specific Vietnamese conditions.

The chosen soil stabilization method pertains to that which could be called peak technology, not necessarily because it is very complicated, but rather because it is not yet fully-developed in Sweden - or in any other country. So far there is not any great empirical experience with the method. It also pertains to the category of peak technology for another reason. It is so recently developed that benefit and use, as well as documentation of it, ought to be comprehended in an analytical perspective. The lime column method seldom solves a soil problem at a working site, but rather makes up one method of many more which, together and in varying combinations, make up an arsenal. With the help

of this arsenal, certain requested functional characteristics of the ground can be reached at the building site in question. The Swedish researchers who took part in the project have also been loyal to this approach. This explains the continual pressure for a change of direction of the cooperation, previously mentioned in chapter 3.2. The Swedish building sector has gradually been transferred over to this analytical form during the past two decades, but this transformation is not yet completed. The problems of strict application are important.

The Vietnamese, however, find themselves in another situation. The country's research standardization, and moreover, often the researchers' way of looking at things, is characterized by the "specification approach". It is expected that the research will lead to directly applicable rules for the application of the method. These rules ought to be of a general character and applicable to different building sites without extensive analyses of the local conditions having to be carried out by technically qualified personnel. Specification norms often have the characteristics of "rules of thumb" and standard solutions. The Vietnamese building norms are largely comprised of this sort of standard solutions, both in regard to the buildings as a whole as well as their parts.

A similar analysis, with regard to the three identified strategies for technology transfer, can be made for the large panel factories. The technology in this case is definitely not advanced or modern, but rather outdated. It has been tried widely and with questionable success. There does not seem to have been much of a science component in the transfer. It clearly belongs to the second strategy ($P_a + P_b + T_b$), and one could assume that it would have had a good scope for success. It is well adapted to the prevailing specification norms in Vietnam. All qualified decisions with regard to the product is to be made at the factory, and thus there is little demand for specialized competence at the sites.

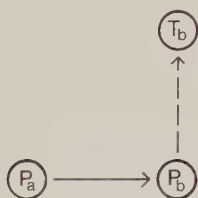


Figure 3:10 The large panel project followed the second strategy but a vertical integration was never achieved.

The first step of the transfer ($Pa \rightarrow Pb$) was seemingly achieved. Problems arose when the second step was to be achieved ($Pb \rightarrow Tb$) since there were too many factors in the Vietnamese society which were not fit for the technology and which, moreover, proved to be far too difficult to change. These factors proved to be stable, and thus the transfer came to a halt. If these factors would have been possible to manipulate, and thus variable, the technology would have been adapted to the specific Vietnamese conditions. This would have added one more step to the transfer model ($Tb \rightarrow P'b$).

3.5 Appropriate Technology

A fourth strategy is sometimes mentioned as the choice of so-called "appropriate technology". The meaning of this concept varies a great deal. A sort of movement began which gathered many believers, mostly from the industrial countries. Books such as "Appropriate Technology Sourcebook" (Darrow & Pam 1976) account for a very large number of techniques and advocates the use of these. This summon is specially directed to the developing countries who, in this way, could rediscover their often previously available technique.

The advocates of the "Appropriate Technology" movement are often insensible to the interplay between the chosen technique and the social conditions prevailing for each individual project. (See Naipul 1978:114-124). In this sense, "Appropriate Technology" within the geo-technological area in Vietnam would supposedly mean that the country should rediscover the currently used method of driving piles under buildings with a large number of approximately three-meter-long bamboo rods. The conditions can be schematized: ($Tb \rightarrow Ta \rightarrow Pb$). As shown, it can be doubtful to speak of transfer of technology in this case, since the representatives from the industrialized country instead have the role of animator, while the knowledge of the technique is situated - if anywhere - within the developing country

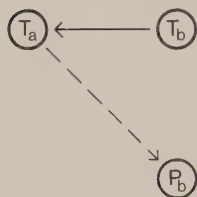


Figure 3:11 Technology transfer diagram for "appropriate technology".

In the schematic sense, the concept "appropriate technology" is void. It can be claimed that all technique which has been "chosen" is suitable. Otherwise, it would not have been chosen. The concept of suitability in all likelihood ought to include all the factors and

interests which, in a given situation, determine the choice. As a rule, it is instead intended that some or many of these factors should possibly be altered through animation or regulation. It probably would not suffice to piously point to already discarded technique. Drewer has discussed obstacles for the choice of "appropriate" construction technology (1982/B). He states that "most discussions on appropriate technology in construction are centered on the creation of employment and use of local building materials. The wider implications and the ambiguity of the concept are frequently ignored".

Stewart (1978) identified two components which are central to our problem; one is the appropriate choice between techniques, and the other the development of more appropriate techniques.

Leading aid organizations have, however, attempted to list criteria which could assist in determining the appropriateness of the different technologies. The World Bank (1976) suggests that the following criteria should be considered:

Appropriateness of goal;	relation between technology and development policy
Appropriateness of product;	useful, acceptable and affordable to user
Appropriateness of process;	economic use of inputs and cultural and environmental appropriateness; compatible with local culture and environment.

Another study by UNDP/IBRD, which is cited by Drewer (1982/B:44), specifies not less than eleven criteria:

- amount of local labour incorporated - objective to maximize,
- amount of indigenous material used - objective to maximize,
- functional performance,
- replicability,
- capital cost,
- life cycle cost,
- time to implement,
- amount of foreign exchange component - objective to minimize,
- environmental impact,
- social impact, and
- economic impact.

Drewer continues by stating that these criteria can very well be mutually incompatible. Those involved in weighing these criteria often have, moreover, different

perspectives. One assumption which must be made with these lists of criteria is that a real choice of alternatives exists. There is however, a series of conditions which limit the possibilities of selection in regard to technique within the construction sector. "The lack of clear, realistic objectives for specific sub-sectors of construction is the single most important constraint on the application and development of more appropriate construction techniques. In their absence, it is not possible to define a consistent set of criteria for choice of technique nor a strategy for developing new appropriate techniques" (1982/B:38).

Turin has schematically distributed the output of the different parts of the construction industry in a "typical" developing country. See table 3:2.

		Technological level				Total
		Very high	High	Medium	Low	
Type of Work	Civil Engineering	11 3 — —	2 5 — —	— 3 1 —	— — 1 2	28
	Building	3 2 — —	2 12 1 —	— 5 15 —	— — 4 13	57
	Repairing and Maintenance	2 2 — —	— 2 1 —	— — 3 —	— — — 5	15
	TOTALS	23	25	27	25	100
Sector of Industry	International Modern (IM)	16	4	—	—	20
	National Modern (NM)	7	19	8	—	34
	National Conventional (NC)	—	2	19	5	26
	National Traditional (NT)	—	—	—	20	20
		IM NM NC NT	IM NM NC NT	IM NM NC NT	IM NM NC NT	

Table 3:2 Example of percentage breakdown of construction output, by technological level and by sector of industry (Developing country, around 1965) (Turin 1973:42).

It is shown that the construction sector is to a large degree compound, and that the different parts rely on each other. It is differences between objects, and a given object consists of many levels of technology and sectors of the construction industry:

"Assuming that the objective of an overall strategy for the development of construction were to match the technological level of demand with the local capability of the different sectors of the industry, two extreme alternatives would be open to the planner: to develop the sectors to fit the accepted technological level of demand, or to adapt the technology of demand to fit local capacities. Few countries have succeeded in the former, fewer still have even attempted the latter approach" (Turin 1973:42).

3.6 Characteristics of Building Technology

Turin lists some of the conditions which limit the construction industry's development and rational use in many less industrialized countries. He implies that the construction industry differentiates from other industrial activity in certain important aspects, but that this is not always noticed. He gives the following propositions (Turin 73:44,45) in summary:

- I To recognize the importance of construction in the national economy,
- II to recognize the variety of possible technologies and relate them to available resources,
- III to appreciate the relative labour intensity of construction even in the modern sector,
- IV to accept the fragmentation of the construction industry,
- V to improve the reliability of national products,
- VI to place building contractors on the same footing as other producers,
- VII to use the public client for introducing and encouraging the use of adequate technology,
- VIII to improve the network of distribution of resources within the country,
- IX to facilitate the flow of finance, and
- X to abandon meaningless statutory instruments and regulations.

The perspective which Turin has set up here is based on the development of the construction industry. It is a perspective which can be of use to decision-makers and politicians. Another, complementary perspective based on the individual building is, however, more operational, if the actual goal is to search for a "better" combination of technologies or to develop new ones. This perspective is, however, less common in matters of aid. The reason for this could possibly be that the interests of the sector have consciously been restrained so that the policies of country programming would not be distorted.

It is not the intent that a reversion to a more formal project/sector way of thinking would be desirable. If construction in aid is to be improved, however, a micro perspective must be employed.

Such a perspective could mean that the building is accepted as a product, resulting from industrial and societal processes. Four distinctive features can then be identified:

1. Turin argued that there is "one essential and probably unique feature of a building which differentiates it from all other industrial products: a building is sold before it is made" (1966). In the industrialized countries, the client and the future users are protected by an entire set of codes and regulations. These are not, as far as aid is concerned, always suitable, and sometimes directly misleading. The existing building codes and regulations in developing countries are frequently inappropriate.

The first recommendation of the UN seminar on building codes and regulations (BFR 1981) begins as follows: "Many developing countries lack adequate legislation on construction and upgrading of built environment... Present codes and regulations are very often inconsistent with national goals for human settlements. Furthermore, in most developing countries they address the needs of a limited section of the population."

Codes and regulations could be said to be a summary of "conventional wisdom" of construction within a given country. They are normally complemented by the participation of experienced architects and engineering consultants in the design process. In the developing countries, however, these very same consultants lack the relevant experience. Many developing countries will depend on foreign consultants for quite some time to come. Drewer concludes (1982/B:47), that "while in the long run, the dependency on expatriate resources must be broken, in the short-medium term they are going to remain an essential component in construction in most developing countries."

2. Another distinctive feature of buildings is that buildings are, relatively seen, very constant products. (The obvious exception to this rule is, of course, a large part of the "informal" construction activity in developing countries). They are, moreover, stationary. In this context those who design the building have the possibility to follow the development of the object during a long course of years.

The buildings thus could inform their originators of committed errors. This constant "evaluation" within the trade often becomes, in matters dealing with developing countries, impossible. Decision-makers and consultants do not have fre-

quent opportunities to return to the site. The problem is aggravated by the fact that the local planning capacity is weak. Foreign experts have only short contracts and consultants are, by definition, competing with each other, which is why obtained experience is often safe-guarded and eventually lost.

A related problem is made up of the fact that the life-cycle cost for a building can be divided up into three clearly distinct phases; the investment phase, the operation phase and the demolition phase. (The demolition phase is, in this context, only of academic interest, and is put to the side.) During the investment phase very large resources of aid were consumed. We have been able to show this in section 2.4.

The committment of expenses within this phase furthermore takes place to a greater part in a very early stage (see figure 3:12).

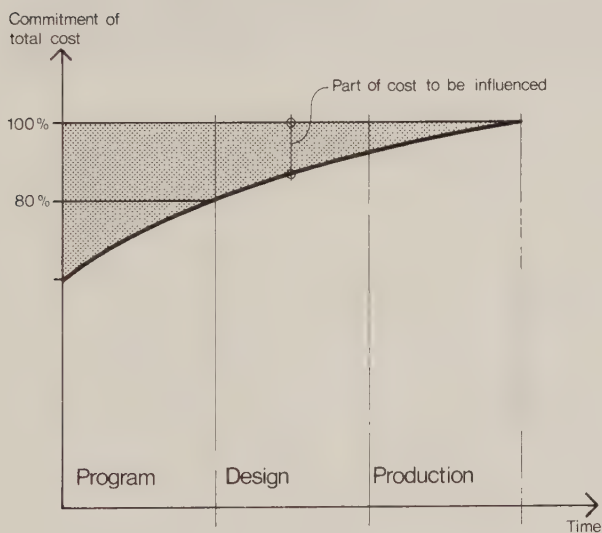


Figure 3:12 Relation between stages of the investment phase and part of investment cost to be influenced (Söderberg 1978:34).

In keeping with this, only a minor part of the expenses can be affected, even by the most competent consultants, once the need has been defined. Thus, the person who defines a need (which a construction project should contribute to satisfying) must have knowledge of the connection between need and technical solution. This knowledge is often lacking when the client

is an authority without special competence in construction, e g in relation to aid.

In addition, these early decisions will not only decide the investment costs, but also influence the costs incurred during the operation phase. This is valid both for direct maintenance costs, and for indirect "costs" caused by poor design etc, restricting the usability of the building.

3. A third distinctive feature of the building is that the construction industry is still relatively unadvanced. The economy, based on serial production, is weakly accentuated, which means that industrial construction methods and systems have difficulties in keeping up with the more manual or traditional methods. This even regards the industrial countries, illustrated by an example:

During the 1960's there were several highly industrialized techniques advanced in Sweden for the production of small houses. Both wall and volume were to be prefabricated in a factory and the part of the work involving hand-made parts was to be greatly limited. Different specialists and component-makers represented the new techniques. Large investments were made in factory buildings and production lines. The larger construction firms in particular expected to make important savings in the more rational production.

Others within the different building branches remained, for the time being, hesitant to these developments. They continued instead to develop the traditional piece-work techniques. During the last years we have been able to observe a general return to the "older" techniques. This return has occurred when it has now been shown that the general societal conditions have thus far not supported the new industrialized techniques.

Correspondingly, the construction industry of the industrial countries has met a hardening market in the so-called oil-producing countries at the same time that a period of extreme excess of currency in these countries appears to be nearing its end. Construction firms from other countries (especially the so-called NIC) can compete due to, among other things, the low price of industrialization of the building, i.e the product. However, in matters dealing with aid, one is often met with strong belief in the benediction of the industrial methods. The belief is shared by both the aid donator and the authority receiving the aid. I have shed more light on this matter (1980/A:23). The majority of a group



Figure 3:13 Industrialized housing has its drawbacks (Löddeköpinge, Sweden).

of programme officers from the aid authority meant that it was generally quicker to carry out a construction project if an imported, pre-fabricated system was used. It was probably "cheaper and better" if expatriate experts were allowed to do the design. Corresponding opinions are often held by the authorities of the receiving country.

4. A fourth distinctive feature is that a building is usually used by laymen (from the construction-technical point of view). After the investment phase the building is consigned, and afterwards principally forms a shell around the intended activity. There are many examples showing that buildings were "over-designed" in relation to the needs and possibilities of the future user. Public participation is often seen as a means in preventing this, in order to decrease the costs. The possibilities for user participation appear to increase when the user identifies himself with the client. It is thus stated in the fifth recommendation that

"the people themselves constitute the major resource for the improvement of their settlements. The timely provision of adequate shelter and infrastructure to the majority of the people cannot be accomplished without fully

utilizing self-help programmes and popular participation."

Others are less convinced of the merit of self-help and participation (Huque, 1982). In some sense it can be stated that aid for construction activity, i.e. housing, involves fewer possibilities for popular participation since the aid, as a rule, is arranged by the authorities in the receiving country and thereby strengthens their influence. For a more detailed discussion, see Reuterswärd (1980/B:25).

3.7 Choice of Technology

The concept of "building technology" can be divided up into three dimensions. These are based on the fact that construction technology has certain distinctive features in relationship to other technology. One can imagine that a building, from a technological point of view, is dependent on three technology dimensions. These are:

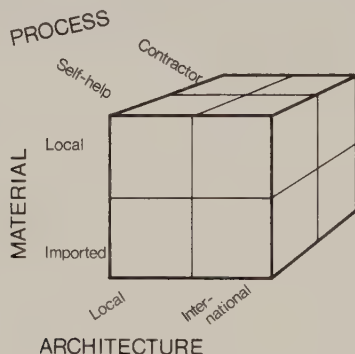


Figure 3:14 The dimensions of building technology.

1. ARCHITECTURE and design in regard to usefulness, and appearance. Here, one can mainly distinguish between
 - A) local
 - B) international
2. MATERIAL, construction components as well as their adjoining parts, installations and equipments. Here, one can mainly distinguish between
 - 1) local
 - 2) imported

3. PROCESS, that is, the form under which the construction of the building is carried out. Here, one can mainly distinguish between two main forms

- alfa) self-help construction
- beta) construction by a contractor

The three dimensions can be related in accordance with figure 3:14.

The first dimension of construction technology can be said to be the architecture. With this, the design of the building, appearance and usefulness are referred to. If the perspective is limited to the rather simple buildings which aid usually finances, it can be said that the design of the building can vary within rather wide boundaries without influencing the use in a measurable way. Education in primary schools can take place - and takes place - in rooms which differ greatly from each other in quality, without having to state that the quality of the education varies to any comparable degree. From a functional point of view, it can be said that a directly unsuitable designed building can interfere with the activity. If the design of the building, however, reaches a certain lowest acceptable standard, an increased quality cannot be expected to independently improve the activity. Looking at the other end of the scale, there are examples of buildings which have been designed in order to give too many possibilities. The users are thus incapable to profit from these, and state that they lack the restrictions of a building which they are used to working with. (The most typical example of this is exhibition halls, which, during the recent years, have been designed as open halls with moveable room dividers, often to the confusion of the personnel (Arkitektur 1981, No 1).

The design of the building is the focus of the architect's interests. Architects from northern West Europe have been educated in the functional attitude during the past generation. The approach has been functionally analytical, and this could be economical and rational when dealing with developing countries. The architect from the donating country often advocates a more simple and rational building than the colleague from the receiving country. The expectations for the symbolic value of the building differs, and "modern" design is frequently mixed with the outer appearance.

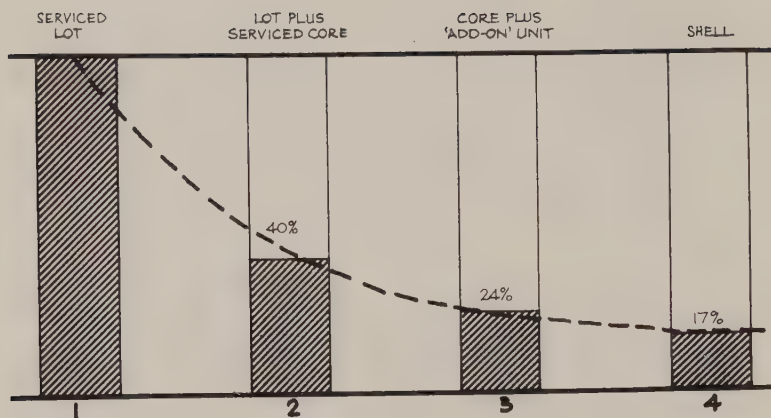
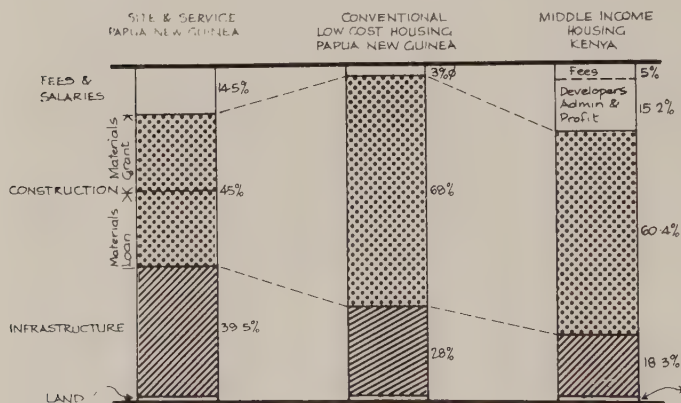


Figure 3:15 Infrastructure as a proportion of total initial construction costs (Cox 1977:119).



Ø Architects fees negligible due to repeat use of house types; * Off-site infrastructure, otherwise land free

Figure 3:16 Total costs (Cox 1977:120).

The second dimension refers to selection of material. The costs for construction material tend to increase relatively, the more simple the building (to a certain limit). Cox reports (1977:119) that the costs for the carcass for two studied shell housing projects make up two-thirds of the total costs. In this way, there are large possibilities to reduce the costs from the material side since such a large portion of the total costs goes toward this goal. The most important method for decreasing the material costs is to change from import-

ed material to local material. A typical example is the choice between wall materials, that is; concrete blockwork - stabilized soil bricks - burnt bricks - sun-dried bricks - mud. These materials can, if executed correctly, give almost mistakenly similar walls. A series of circumstances, however, limit the choice. One such important circumstance is that some of the materials are more difficult to qualitatively standardize, and thereby, decrease the desire of the project leader to specify them. Experienced consultant firms are very conscious of this, and some of them have searched for ways to come around the problem. An example of this is the engineering consultant company Sweco, which has carried out a study of "local building materials" (Egnell & Larsson, 1981).



Figure 3:17 Selected materials can prove to be less suitable as early as during the investment phase (Hai Phong, Vietnam).

At the same time, banks can be unwilling to grant a loan to buildings constructed of "unknown" material. This problem has also been the object for special studies (see Knocke 1982). It should furthermore be remembered that the choice of material is, for two reasons, often a sensitive negotiation matter between the aid donor and the authorities of the receiving country. In the first place, local material is often associated with buildings of a poor standard, thereby causing psychological opposition, especially from the side of the recipient. In the second place, these negotiations often imply that the costs are transferred from one of the parties to the other, and the latter is often reluctant to accept this.

The third dimension of the construction technology is the process through which the building is constructed. In these matters, it is of concern whether the building is constructed through a contractor or through self-construction efforts.

Within both of these main groups there are, of course, a whole series of subgroups as well as intermediate forms. A very common way of "decreasing" the costs for a building is to introduce some form of self-help construction. Figures 3:15 and 3:16 show how the costs can be reduced through more and more rudimentary investments on the part of the society. In this case, it also deals with a transfer of costs and labor investments from one party to another. (A prerequisite is, in this case, that even a serviced lot would result in a house.) In contrast to the conduct for the choice of material, the costs in this case are not transferred from the donator to the receiving authorities, but onwards to the family which will occupy the lot. The justice of this can sometimes be questioned, and it does not improve the matter by using positively-packed words such as "public participation" in the argument. One reason for the great differences in meaning about the benedictions of participation could be that the concepts overlap each other, or give different contents.

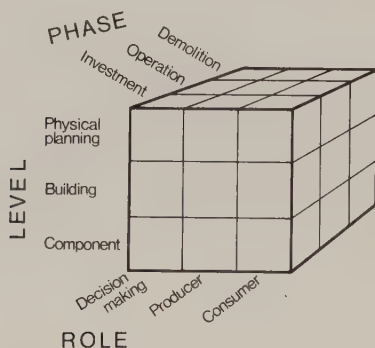


Figure 3:18 Model for analysis of participation.

In an attempt to analyze the signification of "user participation", five projects, presented at a seminar on the subject, have been categorized with reference to three dimensions of the concept. (See Reuterswård 1981 for more detailed discussion.) These were:

1. Levels
 1. physical planning
 2. building
 3. component

- | | |
|------------------|--|
| 2. <u>Phases</u> | A. investment
B. operation
C. demolition |
| 3. <u>Roles</u> | alfa. decision-making
beta. producer
gamma. consumer |

The conclusion was that only two of the five projects could reasonably be given the same code in reference to these three dimensions. Corresponding differences in the interpretation of the concept probably exist in many other contexts.

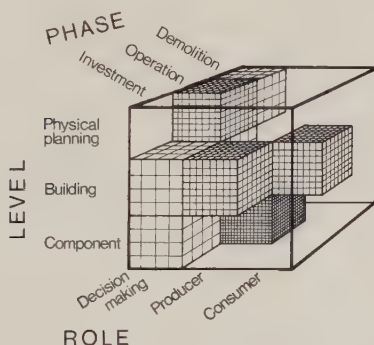


Figure 3:19 Five participation projects illustrated by the model. The more densely checked area, the more frequent combinations of dimensions.

The choice of technology for any given building (in developing countries) can contain, on the whole, eight different combinations of variables. Two of these, however, dominate. With reference to figure 3:20, one of them is (1-a-alfa) and the other is (2-b-beta). These strongly correspond to the so-called informal and formal sectors respectively, and both of the technologies have well-known disadvantages. Any strong technical reason for this division into two parts does not exist. A given building can, when finally completed, very well be built of either local or imported material without influencing its function. In the same way, it is seldom possible to determine afterwards if the building was constructed with the help of a contractor or through self-help-construction. The design, lay-out and general appearance of a building only affects the possibilities to carry out a desired activity to a limited extent, provided that the design meets certain "threshold" properties.

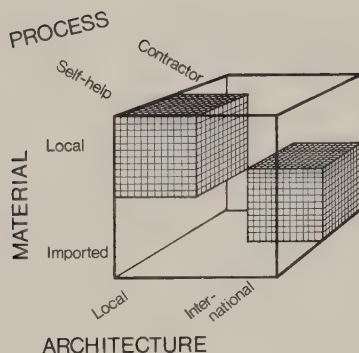


Figure 3:20 The two most frequent combinations of building technology dimensions, corresponding to the formal sector and the informal sector

There is, however, a series of other less concrete reasons for the existing division. These are discussed, among others, by Drewer (1982/B:32). Possibly the proposed model can nonetheless serve as help when more innovative technique combinations are sought for an individual building.

Besides the three technology dimensions, the picture is complicated, when dealing with buildings constructed through aid, by the fact that a building clearly goes through the three mentioned phases; the investment phase, the operation phase and the demolition phase. (The last phase is, in this context, put to the side.) All of the three technology variables can be said to influence the building during both of the phases, often with opposing results. One sort of material can be easy to mount but impossible to maintain. A building which has been designed to be easily produced can be less useful. Lastly, it can be difficult to get the local population to maintain a building which has been well-built by the contractor. All of these three circumstances can in fact be found, though reversed or in combination with each other.

4 EVALUATION OF BUILDING IN AID

4.1 A Perception of the Issue

In the earlier chapters we have shown that building and construction activity presently absorbs a large portion of the aid resources. In the projects which include some form of construction, approximately two-thirds of the available aid is often used for this purpose. Furthermore, we have been able to establish the fact that the available scope of investment of the developing countries is heavily burdened by building investments. At the same time, there is a shortage of buildings and construction in many parts of the world. Construction in the developing countries, especially when carried out through aid, ought to be rendered more effective if possible. Help in this case could be found in systematically retracing experience from projects already carried out. In an attempt to limit the problem, the evaluation of buildings and their use will principally be discussed. Construction and infra-structure are of just as much importance, but this area falls outside the main purpose of this study.

Such is the aim of evaluation of the building component in the long run:

- to increase the benefits within the given scope of investment, alternatively,
- to offer the same benefits for a lower fraction of the scope of investment.

What are the questions which such an evaluation ought to answer? In section 3.7 a model for analysis of the chosen technology for a given building was indicated. The model distinguished between the three dimensions of building technology: The architecture, the material and the process. The model is proposed as an instrument in the evaluation of buildings. This model does, however, not take into consideration one important dimension: time.

A building passes through three distinctly separated phases. The programming, the designing, the construction, the installations, the equipping and the commissioning are accomplished during the investment phase. The operation phase follows thereafter and includes the whole lifetime of the building. Within this phase, a whole series of lesser modifications and reconstructions can be included. This is ultimately followed by the demolishing phase, when the building is set aside or pulled down.

The investment phase

How does the model suit the different phases? We can point out that the principal experience of the architecture of a building is not gained during this phase.

In some cases, however, the experience of the function of the building during the construction stage could be of interest. To which extent has the building shown to be designed in a way which simplifies the construction, the installation or the equipment work? Consideration for the use of the buildings during the investment phase would presumably be of important consequence for the working environment. A construction site is usually a very bad working environment.

Important experience of materials, building components and building technique is gained during the investment phase. Naturally, this experience principally regards the accessibility, the ability of the labourers and the suitability of the labour technique. However, in some cases it remains that some material or a technique reveals itself to be obviously unsuitable for the given environment or the intended use.

Furthermore, it is evident that the investment phase has a lot to give in regards to the suitability of the chosen process. A number of questions can be answered. How has the labour been organized, and how have the different participants been able to act? To which extent have intentions of the problem formulation and the programme been able to be followed-up in a later stage by other participants? Could the labour possibly have been organized in another manner, and to what extent have local skills and resources been mobilized?

The investment phase has always been the object for evaluations, even if these have not been so systematic. The different participants have continually learned from the work, and especially the contractors are in the habit of following up the costs compared to the budget and actual time consumption compared to the time plan. Instead, an evaluation of the investment in its entirety, without limitation of special professional categories should be aimed at. Experience of the general suitability of the chosen building technology could be gained in this way.

The operation phase

The suitability of the architectural design of a building is revealed during the operation phase. Thereby, it is important that the programmed function is compared to the factual function. If there are deviations, it can depend on the fact that the building does not meet the programmed needs, or that these do not correspond to the real needs.

In the same way, this applies to the technique and the material. Their value, general usefulness and the durability are mercilessly revealed during the operation phase. The problem in this situation is that the turnover of personnel and the on-going introduction of new or altered material result in the fact that the gained knowledge is not always retained.

Moreover, knowledge of how the operation of the buildings and the maintenance is organized, and even on how their operation - for example, a school curriculum - is organized, and thereby to which degree the potential of the building will be used, can be gained during the operation phase.



Figure 4:1 On-going operation phase in a Unicef school (Trung Nhi, Hanoi, Vietnam).

In conclusion to this reasoning, an evaluation of a building is desired to be formulated to:

- take separately into account the experience from the investment phase and the operation phase
- separately shed light on the three determining dimensions of technology: Architecture, Material and Process, as well as

- objectively seek to verify/falsify relations and distinguish between faults in theory and programme.

Evaluation in theory and practice will be dealt with in the following section.

It is not the aim to create new theories, but rather to shed light on the extent to which existing theories and methods reply to the questions identified here as being important for evaluation of building within the future international development cooperation.

4.2 Evaluation Research

Evaluation research is nothing new. It has been the fashion for decades, particularly in the USA, when evaluating e.g. social reforms. Research groups have been formed to meet administration's demands for neutral evaluation expertise. The literature on the subject is extensive, to say the least, and good reviews are already written. There is no need to re-do this in this context. The interested reader is instead encouraged to make a choice from the annexed bibliography.

We cannot, however, completely ignore the literature. Hoole (1978) especially attracts interest by using the promising heading: "Evaluation Research and Development Activities". He utilizes the evaluation methods for projects in the Third World. He promotes evaluation to the "Evaluation Research Movement". Unfortunately, each movement implies, by definition, that someone is excluded. They either have not yet joined in, or they have already been rejected.

According to Hoole, evaluation research involves, without doubt, "the use of the scientific method to test hypotheses concerning the impact of social action programs" (ibid:19). This could possibly occur since "the evaluation research approach can be seen as one of several quantitative approaches of potential relevance for the evaluation of public policies" (ibid:17).

With this, Hoole not only excludes the issue of this study, but also a whole series of other forms of evaluation. Evaluation research is, according to Hoole, only meaningful if two conditions exist: 1) "there is a clearly stated hypothesis regarding the impact of a social action program"; and 2) "it is possible to obtain relevant and reliable data for the specified variables" (ibid:19). Hoole furthermore delimits the subject by disposing of those who distinguish between impact and process evaluation. He does this by stating that the latter, when distinguished from the former, is "concern with traditional management matters" (ibid:19). The impact hypothesis, defined as a conjectural statement of the relation between two or more variables (Kerlinger 1966:20), must lead to meaningful evaluation

research studies. Hoole means, therefore, that we can, only in exceptional cases, proceed from the official goals if these are badly prepared, altered during the operation of the project or are intentionally contradictory. Under the circumstances they are not researchable, and therefore the goal, and thereby the impact hypothesis, must be of an ad hoc nature. In spite of the liberties which he gives the researcher, he feels the desire to "venture the estimate that at least four-fifths of the contemporary development activities cannot be examined meaningfully through the use of evaluation research..." (Hoole 1978:127).

The book includes nonetheless a clear review of varied principal methods for quantitative research designs, especially the use of time-series data, non-equivalent control group data and randomization. The examples used in attempting to illustrate the advantages and disadvantages of the methods are made up of the WHO Intensified Worldwide Smallpox Eradication Program, the introduction of high-field variety rice in Indonesia and the showing of Sesame Street educational television programmes in Mexico. The examples, possibly indirectly, are rather revealing of the limitations of Hoole's manner of attack. The impact hypotheses are all designed as simple "if-then" sentences. Thereby, the evaluation also gives one of three answers: "Yes", "Maybe" or "No", possibly with a quantitative answer associated to "Yes". In this manner, WHO has accelerated the eradication of smallpox, the new rice has given approximately 500 kilograms of rice more per hectare and Sesame Street increased the level of education. Hoole seems insensible to resulting questions such as "why" or "was it worth the price?" He hardly mentions one of the greatest problems of development cooperation, the unforeseeable consequences, and does not wonder if the same result could have been reached in an easier way. (A marginal note: Hoole means that according to his experience, 1-2 % of the budget for development cooperation ought to be set aside for this type of evaluation. In regard to Sweden, this would mean that between 40 and 80 million Swedish Crowns per year could be only used for evaluation of the bilateral aid...)

He makes, however, an important and presumably correct assertion that "the types of research problems encountered in the development field are not different from those found in developed countries" (ibid:132).

We can, therefore, hopefully address more established names within the evaluation research movement.

Weiss (1972), for example, widens the perspective by stating that "evaluation uses the methods and tools of social research but applies them in an action context which is intrinsically inhospitable to them" (ibid: vii). She furthermore states that "the purpose of eval-

uation research is to measure the effects of a program against the goals it set out to accomplish as a means of contributing to subsequent decision-making about the program and improving future programming" (ibid:4).

This aim has an important breadth and is easier to support. Henceforth, Weiss also gives good advice which an evaluator-to-be ought not miss acquainting himself with. She finds the quantitative methods to be scientifically acceptable, but even says that "an evaluation, then, points out weaknesses, but often offers only the barest hints for solution. There is a gap between data and action that will have to be filled in with intuition, experience, gleaning from the research literature, assumptions based on theory, ideology, and a certain amount of plain guessing" (ibid:125).

Suchman (1969) has defined the problem by noting that "if the program is unsuccessful, there are two general categories of reasons. Either it did not activate the "casual process" which would have culminated in the intended goals (this is a failure of program), or it may have set the presumed "casual process" in motion but the process did not "cause" the desired effects (this is a failure of theory)." This division of programme errors and theory errors is the grounds for goal hierarchy common in matters of aid. The relation can be illustrated by figure 4:2, according to Weiss.

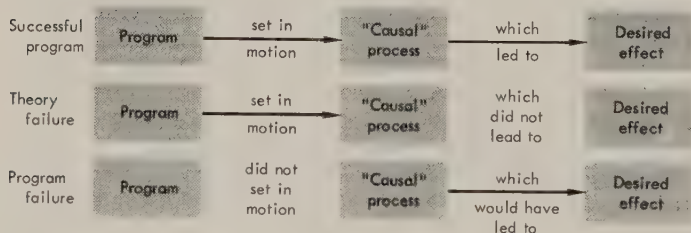


Figure 4:2 Types of program failure (Weiss 1972:38).

The quantitative methods are, however, questioned. Filestead (1979) says, for example, that "the blanket acceptance of the quantitative paradigm as the model for evaluation research is being seriously questioned by the evaluation research community" (ibid:39). He identifies three factors which contribute towards this change

1. The approach to science has been altered. It is not anymore seen as the discoverer of knowledge, but rather that the knowledge is created through individuals and events.
2. Quantitative program evaluations have not always met the expectations. "Administrators had expected these types of evaluations to identify "what works", "who gets better", "what areas to change", and so on. These expectations have not generally been met" (ibid).
3. The conceptual model of standard quantitative evaluations is questioned. It is felt that the fragmentation or compartmentalized style of evaluation leads to distortions of reality and, as a consequence, necessitates a holistic or contextual model of evaluation. "Focussing on a narrow set of variables necessarily sets up a filtering screen between the researcher and the phenomena he is attempting to comprehend. Such barriers, from the vantage point of those employing a holistic analysis, inhibit and thwart the observer from an understanding of what is unique as well as what is generalizable from the data, and from perceiving the processes involved in contrast to simply the outcomes" (Rist 1977:47).

At this point, it should be clear to the reader that architect evaluators are under academic cross-fire. On the one hand, a building as an object is a suitable object for quantitative evaluation, but at the same time, architects are the holists of the branch. Drewer (1982/A:5) has stated that "architects design buildings as a complex whole to enable a specific set of social and economic activities to be performed... (their) design function is then to some extent holistic." Reichardt and Cook (1979:19) are therefore quoted with genuine relief: "We have seen that the choice of methods should not be determined by allegiance to an arbitrary paradigm. This is both because a paradigm is not inherently linked to a set of methods, and because the characteristics of the specific research setting are equally as important as the attributes of a paradigm in choosing a method. We have also seen that a researcher need not adhere blindly to one of the polar-extreme paradigms that have been labeled "qualitative" and "quantitative" but can freely choose a mix of attributes from both paradigms so as to best fit the demands of the research problem at hand. There would seem to be, then, not reason to choose between qualitative and quantitative methods either. Evaluators would be wise to use whatever methods are best suited to their research needs, regardless of the method's traditional affiliations. If that should call for a combination of qualitative and quantitative methods, then so be it." See table 4:1.

Qualitative Paradigm	Quantitative Paradigm
Advocates the use of qualitative methods.	Advocates the use of quantitative methods.
Phenomenologism and verstehen; "concerned with <i>understanding</i> human behavior from the actor's own frame of reference." ^a	Logical-positivism; "seeks the <i>facts</i> or <i>causes</i> of social phenomena with little regard for the subjective states of individuals." ^a
Naturalistic and uncontrolled observation.	Obtrusive and controlled measurement.
Subjective.	Objective.
Close to the data; the "insider" perspective.	Removed from the data; the "outsider" perspective.
Grounded, discovery-oriented, exploratory, expansionist, descriptive, and inductive.	Ungrounded, verification-oriented, confirmatory, reductionist, inferential, and hypothetico-deductive.
Process-oriented.	Outcome-oriented.
Valid; "real," "rich," and "deep" data.	Reliable; "hard," and replicable data.
Ungeneralizable; single case studies.	Generalizable; multiple case studies.
Holistic.	Particularistic.
Assumes a dynamic reality.	Assumes a stable reality.

a. Quotes from Bogdan and Taylor (1975: 2).

Table 4:1 Attributes of the Qualitative and Quantitative Paradigms (Reichardt & Cook 1979:10).

	Analyses	Qualitative	Quantitative
Data			
Qualitative			
Quantitative			

Figure 4:3 Relation between quantitative and qualitative analyses and quantitative and qualitative data.

The relationship between qualitative and quantitative methods can be illustrated diagrammatically according to figure 4:3. From this, it is evident that from a scientific point of view, it is not crucial whether the method is to be regarded as quantitative or qualitative, but rather whether the data is quantitative or qualitative.

To us, the central issue is evaluation of aid programmes with a building component or even building projects within a more comprehensive programme. This provides us with a comparative advantage to those evaluating more general social activities. The provision of external resources usually means that the activity under study has a defined starting point and an end, and that goals are specified. Our focus is thus on programme evaluation or even project evaluation.

Franklin and Thrasher (1976) describe comprehensive possibilities and limitations with programme evaluation and give the concept a definition which is "a reasonably broad one and includes within the boundaries of evaluation the process of securing valid, reliable, and applicable information about program, program structures, processes, outcomes and impacts, to permit managers to make decisions for program improvements and fulfill their responsibilities for public accountability" (ibid:23).

Programme evaluation has an aim which distinguishes the concept from the more general evaluation, and which also emphasizes the difference from evaluative research. It can be delimited to "the use of scientific research methods and techniques for collecting and analyzing data which increase the possibility for "proving" rather than "asserting" the worth of some social activity" (Suchman 1967:8).

Franklin and Thrasher also show a simplified model of the function of evaluation within the broader concept of "programme" management. See figure 4:4. They state that "definitions of program evaluation tend to have a strong flavour of the disciplinary backgrounds of the definers" (1976:20). Furthermore "most of the illustrative material in this book is taken from the area of mental health, reflecting the professional concerns and experience of the authors. The issues addressed and the techniques discussed, however, are equally applicable to the fields of public health, education, social welfare, developmental disabilities, public administration, nutrition, gerontology, rehabilitation, poverty, delinquency, criminal justice, and many others" (ibid:18).

The question is whether or not these techniques are also suitable in the field of building or, more correctly expressed, whether these give the programme management any information on the buildings which so often are an important feature in social programmes in the sphere of

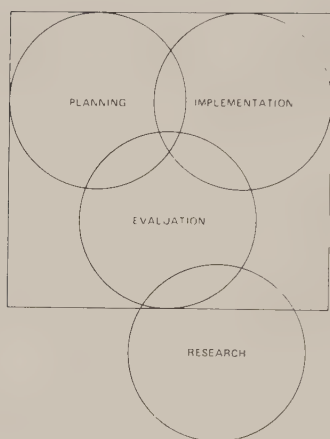


Figure 4:4 The interrelated functions of management (Franklin & Thrasher 1976:174).

health, education, etc. Franklin and Thrasher do not suggest that buildings have been included in their examples, and their interest is, under all circumstances, entirely aimed towards the activity itself, that is, that which also can be called the operation phase of a building, depending on the background. No suggestions at all are made that the success or the failure of the program could have been influenced directly or indirectly by the design of the buildings or by the accomplishment of the investment phase. These have without doubt been seen as stable factors in the programme which is a doubtful assumption, especially for programmes within, for example, mental health.

Franklin and Thrasher say, that "control is management's ultimate reason for making use of program evaluation. The use of information to make, or to decide against, changes in programs is the essential control function of management and the desired utilization of evaluation" (ibid:169). Evaluation should participate in simplifying "a judgement about how to maximize effectiveness". Ex-post evaluation should thus principally simplify ex-ante decisions which are commonly called appraisal decisions. Thus our question is, whether it is correct to view the building and the physical structure as a constant factor in an appraisal also, only because it thus took place in the evaluations? The building and the physical structure of an activity have not been dealt with in any of the theoretically-aimed literature on evaluations which we have seen.

In the literature on appraisals (or ex-ante evaluations, for those who prefer) we found an absolute expressed interest in the special conditions which build-

ing investment implies. A review of various international organizations' methods for project appraisal in developing countries has been made by OECD and Bussery (1973). He concludes that it "will also be noted that our analysis, like most of the literature dealing with these questions, has concentrated mainly on methods applicable to projects with a tradeable output, with a limited extension to public utilities. On the other hand infrastructure projects of all kinds, and those in education, public health, town planning, land improvement, or agricultural research, which absorbs most of the official development aid given by the developed countries, have only been touched on very rapidly from the standpoints of methods of appraisal" (ibid:58).

Bussery is thus conscious of the fact that appraisal methods have mainly been developed and put to use in aid projects with tradeable outputs. This is, however, obviously not the case for a great part of the building projects. Bussery excuses this situation by stating that "apart from the simple criteria of keeping the discounted cost to a minimum, there are a few factors which are really common to such a wide variety of projects" (ibid).

It is sufficient for us to state that there is at least one common factor for these projects - the construction component!

Soumelis has successfully attempted to link together evaluation with appraisal in UNESCO's publication "Project Evaluation Methodologies and Techniques" (1977). He writes, that "current practices for area and project identification seem to systematically neglect the evaluation of the system's real performance. Decisions on possible projects are either based entirely on political factors, reflecting mainly a political wish for certain types of projects in a particular country and/or region, or they are based on some crude quantitative indicators which are, in turn, compared to standards taken from other countries or to the policy objectives of the countries involved" (ibid:26). Furthermore, he says that "the evaluation of a system's performance could be made either on the basis of the system as an entity and/or on the basis of the performance of its various components (or sub-systems). Which of these two approaches will be followed will depend on the type of the system and the existing possibility" (ibid:25). A diagram is given, illustrating various sequences in project evaluation (figure 4:5). It links the project implementation to the design of alternative projects and to the project operation but not to the impact or outcome evaluation. To us, this is a major shortcoming, since it implies that the investment phase would not be the object of any evaluation.

Soumelis selects an educational system for demonstration purposes. He motivates this delimitation by the

Different opinions can evidently be had on that which is easy or difficult, especially in the light of the individual speciality. Soumelis presents, however, an exceptional model for evaluation as an integrated part of decision-making. He bases this on a deciding module (figure 4:7). This module is later repeated on "three conceptually well-differentiated decision-making levels, namely the normative or policy, the strategic or programme and the tactical or project levels" (figure 4:8).

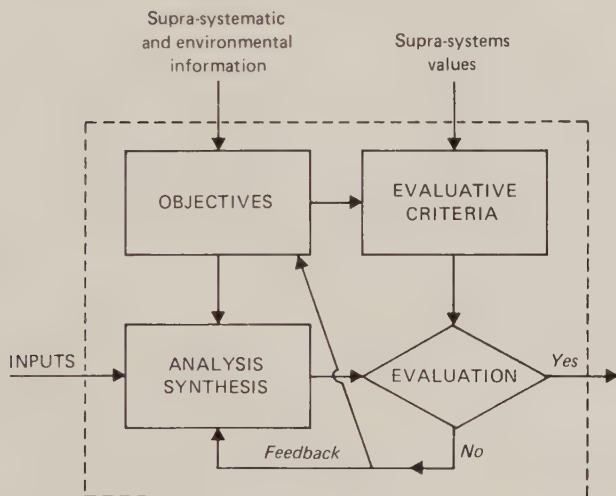


Figure 4:7 The deciding module (Soumelis 1977:18).

It clearly shows the differences between evaluation of a project during the planning phases, the implementation phase and the operation phase. It is at the same time shown that the implementation phase consists of reaching a long line of production targets, but that these do not individually cooperate parallel with each other in attaining an intermediate goal. On the contrary, the production targets are in a sequence, and therefore mutually dependent on each other.

Soumelis' diagram thus supports our basic assumption, that the evaluation of the investment phase of a building programme calls for a strategy of its own. A general, theoretical framework for the concept "evaluation" is nevertheless needed and - indeed - offered by Nils-tun (Edlund 1982:13ff). He has made an ambitious effort to investigate the difference between the fundamental evaluation questions and the respective types of analyses in a report entitled "Methods for Evaluation of Reforms on Labourlife".

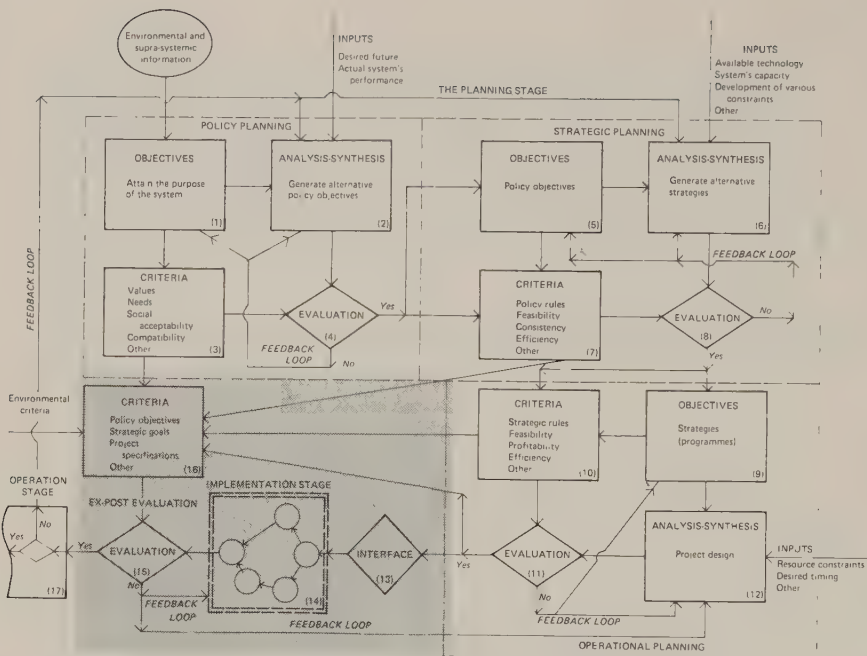


Figure 4:8 Evaluation on different decision-making levels (Soumelis 1977:20,21). The special character of the implementation stage is shown.

He asks, what are the categories of phenomena to be studied in an evaluation? In order to structure the issue, an analytical model is proposed:

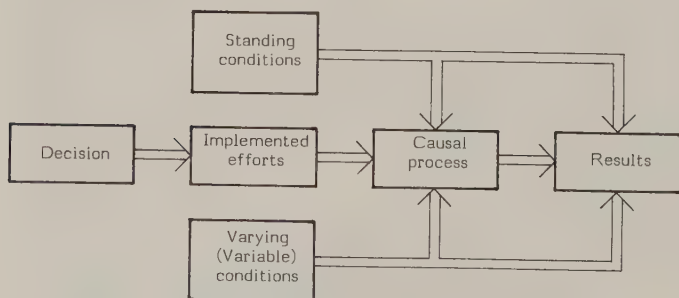


Figure 4:9 Analytical model for evaluation (Edlund 1982:13).

In this model, the variables are subdivided into six categories. The double arrows indicate causal relations of interest for the evaluation. From the model, six questions are deducted, which an evaluation might seek to answer. These questions complement each other in a systematic way. To each question, a corresponding type of analysis is given:

<u>Evaluation Question</u>	<u>Type of Analysis</u>
What efforts were made in order to realize the goals?	Effort Analysis
What were the results of these efforts?	Result Analysis
What conditions cooperated with the efforts concerning these results?	Causal Analysis
In what way were the efforts related to the results?	Process Analysis
How were the results related to the goals?	Goal Achievement Analysis
Were the efforts an efficient way of achieving the results?	Efficiency Analysis

Nilstun continues to clarify the meaning of each type of analysis by relating them, in diagrams, to the analytical model:

Effort Analysis

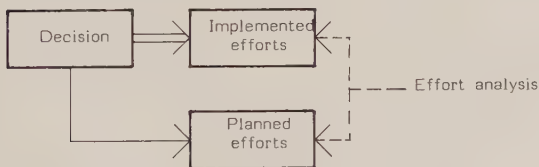


Figure 4:10 Effort Analysis diagram.

An effort analysis is to identify and assess efforts induced by the decision. In this and the following diagrams, a double arrow indicates a causal relation, while a single arrow indicates an intrinsic relation to the decision. A dotted line indicates the variable or variables which are the object of the analysis in question.

Result Analysis

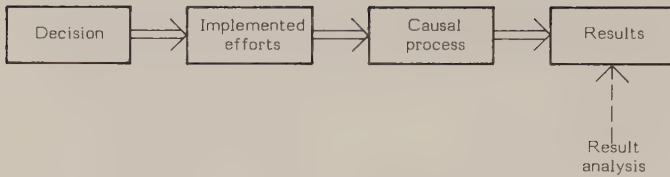


Figure 4:11 Result Analysis diagram.

A result analysis is to identify and assess changes in selected areas caused by the efforts. The variable "result" can, of course, mean many different kinds of results, and is not limited to the results envisaged by the formal goals of the project.

Causal Analysis

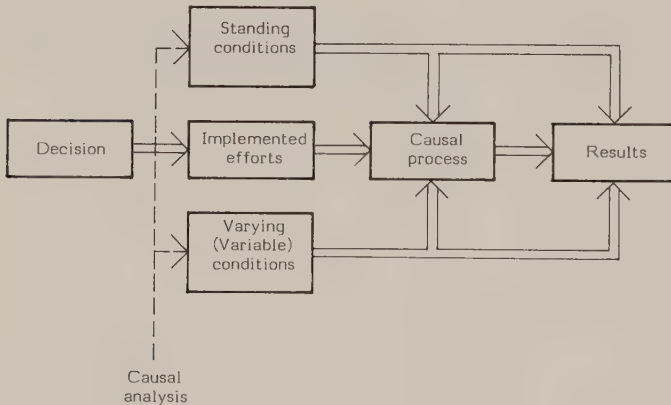


Figure 4:12 Causal Analysis diagram.

A causal analysis is to identify and assess the relative causal importance of factors influencing the efforts, processes and results. In a causal analysis, the interest is focused on the influence of stable and varying factors, meaning factors which have changed during the implementation of the project or the period to be studied. This is in line with his focus on explaining the causal relations influencing a certain course of action. In relation to evaluating a building programme, this concept is less valid. This is particularly so concerning the investment phase, which usually encompasses a relatively limited time period. Our focus is normative and thus it is more relevant to use the concept variable factors, defined as factors which

would have been or would be possible to change or manipulate. Access to land, availability of local building materials and the structure of executing agencies are typical examples of such factors.

Process Analysis

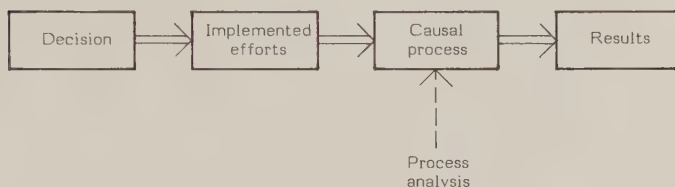


Figure 4:13 Process Analysis diagram.

A process analysis is to identify and assess the processes through which the results were achieved.

Nilstun notes, that there is no distinct division between effort analysis and process analysis. The former is limited to investigating executed efforts and to compare these with the planned efforts. The latter is more geared to analyzing the dimension and direction of the efforts in order to map the phases of development which the programme has undergone.

Goal Achievement Analysis

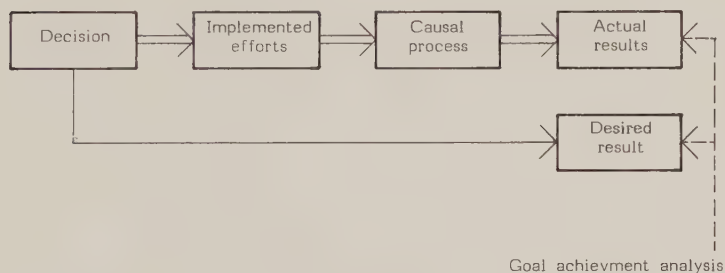


Figure 4:14 Goal Achievement Analysis diagram.

A goal achievement analysis is to identify goals and compare them with efforts, processes and results. The issue of identifying the goals of a programme is central to this analysis, and will be discussed later in this chapter.

An efficiency analysis identifies deficiencies in the working of the programme and recommends improvements. According to this analysis, the evaluation is related directly to the policy employed for the programme. Provided that there are deficiencies in the achievement of

Efficiency Analysis

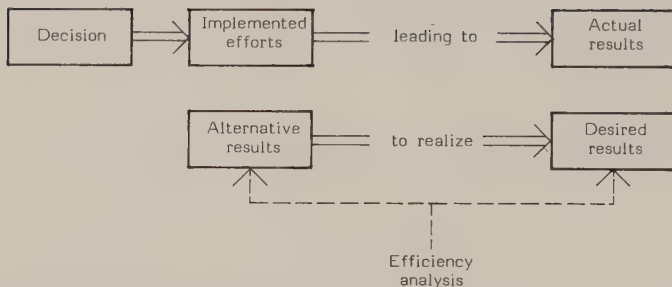


Figure 4:15 Efficiency Analysis diagram.

goals (or that the cost was too high), the central question is: What alternative efforts might have contributed to achieving the goals in a more efficient way?

Nilstun concludes, that "a comprehensive evaluation of a program consists of mapping the program's background, contents and goals; to provide a review of the categories of variables which can be found in the process of change under study, that is to develop models of analysis; and to carry out an effort analysis, a result analysis, a causal analysis, a process analysis, a goal achievement analysis and an efficiency analysis."

The term "evaluation" can now be defined as a blanket expression for the whole or for parts of this activity, and as a connotation for the result of the activity. The term "evaluation research", on the other hand, connotes only an evaluation activity which meets reasonable scientific demands. To carry out evaluation research is, thus, to constantly evaluate. But an evaluation is only evaluation research if it meets certain quality criteria" (ibid:18,19; our translation).

The analytical model for evaluation research provided by Nilstun has been developed for evaluating programmes in the labour market. Nevertheless, it does respond to our first criteria. It can be applied both to the investment and the operation phase of a building programme. The six types of analyses seem to provide an excellent frame of reference when an evaluation study of a building project is designed. In practice, it might prove less convenient to maintain a strict division between the analyses, since an overlap with repetitions is difficult to avoid. Repetitions will reduce the readability of the report, and thus hamper the impact of the findings of the evaluation.

In chapter 3.4 a model was suggested for the analysis of the transfer of (building) technology.

Does this model have any bearing on the types of evaluation analyses provided by Nilstun? The analysis of the transfer of building technology within a given programme is not clearly linked to any specific evaluation question. Moreover, the true merits of a transferred technology are not evident directly after the first step of the transfer, but depend on the extent to which the technology proves to be adapted to more general societal conditions. Of equal importance are the complementary activities which the programme might include in order to facilitate the integration of the technology. This could mean training, research cooperation or equipping of workshops. The study of the technology transferred should thus be made independently both during the investment phase evaluation and the operation phase evaluation. The failure of a transferred technology might be quite evident as early as during the investment phase and immediately after, but in order to explain the reason for this, a more long-term study during the operation phase might be necessary.

The model for technology transfer seems to be particularly relevant in the effort analysis and the causal analysis. If a transferred technology was less successful, was it due to a lack of complementary efforts (A) or was it due to societal conditions (B)? In the latter case, was it because the technology was contradictory to stable factors (B 1) or because variable factors were neglected (B 2)? The explanations A and B 2 are programme errors, whereas B 1 is a theory error.

In chapter 4.1, one requirement of an evaluation of a building was identified to separately shed light on the three determining dimensions of building technology: architecture, material and process. This is a central issue, and an analytical model aimed at showing this was designed in chapter 3.7:

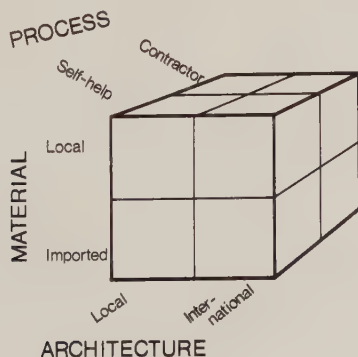


Figure 4:16 The dimensions of building technology.

This model is not only thought to be an analytical tool, but also to include a normative element. The purpose of analyzing the composition of the three dimensions of the building technology is to focus interest on more innovative and efficient solutions. The model is thus primarily related to the efficiency analysis, but would equally be of use in the causal analysis. The model seems to be most relevant in relation to an evaluation of the investment phase, whereas an evaluation of the operation phase might need a wider scope for analyzing the chosen technology and, particularly, its relation to the users.

The second three-dimensional model in chapter 3.7, on participation, is likely to be useful for these ends, since "participation" and even "community participation" has become a key concept in the international development cooperation of the eighties. The concept "participation" still lacks precision, and widely different interpretations of "participation" are in use. The model illustrates these different types of participation as follows:

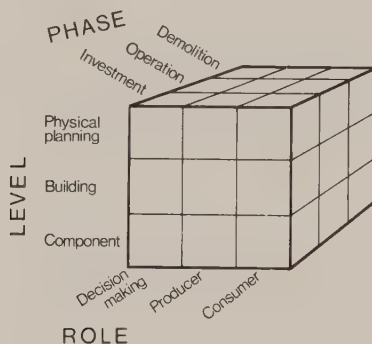


Figure 4:17 Model for analysis of participation.

A central issue of programme evaluation not touched upon earlier in this chapter is the question of how to handle the goals. Most authors in this field discuss this issue and offer all sorts of techniques and attitudes. Weiss has identified four strategies for the evaluator:

- "1. He can pose the question and wait for program personnel to reach a consensus. But as Freeman and Sherwood note, he should bring books to the office to read while waiting for them to agree. And they still may not develop a statement that provides an adequate basis for evaluation.
2. Another thing he can do is read everything about the program he can find, talk to practitioners at length, observe the program in operation and then

sit down and frame the statement of goals himself. Sometimes this is a reasonable procedure, but there are two dangers. One is that he may read his own professional preconceptions into the program and subtly shift the goals (and the ensuing study) in the direction of his own interests. The other risk is that when the study is completed, the program practitioners will dismiss the results with the comment, "But that's not really what we were trying to do at all."

3. He can set up a collaborative effort in goal formulation. This is probably the best approach. Sitting with the program people, the evaluator can offer successive approximations of goal statements. The program staff modifies them, and the discussion continues until agreement is reached.
4. He can table the question of goals, and enter not upon evaluation in the traditional sense, but on a more exploratory, open-ended study. In complex and uncharted areas, this may be a better strategy than formulating arbitrary and superficial "goals" in order to get on with the study while the really significant happenings around the program are allowed to take place unstudied, unanalyzed, and unsung. Evaluations based on too specific goals and indicators of success may be premature in a field in which there is little agreement on what constitutes success (Weiss, 1972:28).

Weiss seems to favour the third option. The obvious risk of giving the evaluator an important role in the definition of goals is that the evaluation will reflect the ambitions and interest of the evaluator more than those of the project. A support for this could be that most evaluations to date, as we shall see later in this chapter, cover aspects related to economy, education and the like, where evaluation research already is fairly well-developed. Some authors tend to consider the issue of programme goals a menace to comprehensive evaluation. This is so assumed, since goals for a programme are made up for formal reasons, or are deliberately formulated to attract funds, or the programme personnel are intimidated by evaluators to provide neat and measurable goals. Others seem to imply that whatever the formal goals of a programme, they do not account for all the actual goals of the participants in the programme. The underlying assumption is that the success or failure of a programme cannot correctly be judged if the outcome is not related to the various sets of goals of involved agencies and actors.

At the extreme end of this scale, we find the advocates of the goal-free evaluation, but this attitude leads nowhere, since it is a paradox. Deutscher, instead,

warns us for the "Goal Trap", meaning that "a sometimes unwarranted and frequently unrealistic emphasis on programme goals persists in evaluation research" (Caro 1977:22). He warns that formal goals frequently are distorted and that a narrow focus on such goals will decrease the capacity to discover unintended or even unanticipated consequences. He concludes, that "it is not necessary to abandon goals and their measurement in order to avoid the goal trap; it is only necessary to avoid spurious goals and invalid measures" (ibid:226). There is also a tactical aspect, from the part of the evaluator, in playing down the formal goals. Weiss writes that "one of the reasons that evaluations are so readily disregarded is that they address only official goals" (1973:40). The moral in this is that decision-makers could not take an evaluation seriously if it only assesses the official goals - instigated by themselves!

When evaluating a building programme, the situation is more clearcut, especially in relation to international aid. To release the external funds, there must be some form of formulated goals. They might be unprecise and even partly contradictory, in which cases it is the task of the evaluator to clarify the set of goals and organize it in a meaningful manner. He might later, in the course of the evaluation, find that the formal goals have not been reached, and even that the efforts of the programme were not induced in any logical way by the formal goals. But the evaluator should not, in my opinion, accept that formal goals are deliberately false or misleading. One should remember that control is the ultimate justification of programme evaluation. Control does not only mean control by the management of the project and personnel, but also by the general public of the management. The formal goals are usually given in one of the few documents of an aid programme which is freely available to the general public. Other project documents are usually red-taped.

4.3 Some Handbooks

A review of handbooks on ex-post evaluation by aid organizations shows that the problem which we are most interested in - the building - has not attracted much attention.

SIDA, in its manual on support preparation (1973) includes, however, a section referring to "building and construction techniques" with some guidelines for appraisal. These guidelines have the character of a checklist. They obviously aim to assure the programme officer that the consultant has treated important aspects, but do not give any guidance on how this treatment can be assessed or in which way an appraisal could be designed so that the degree of performance can later be compared systematically or, even less, measured (ibid:52-55). Thus, it becomes difficult to benefit by



Figure 4:18 End receiver of school building programme (Quang Ninh, Vietnam).

the presumption made in the appraisal stage during a later follow-up of the project. SIDA's manual includes, however, a section which is of special interest in this context. Basic concepts are defined in the introduction and at that time, goal hierarchy is stated as being "one method of breaking down the various objectives in a way which will facilitate planning and implementation" (ibid:19), and as an example, "a possible goal hierarchy and a definition of target groups in connection with a program of school building"(!) is chosen:

"Main objective

To expand and improve primary school education for target group 1 and thereby to improve the living conditions of, in the first instance, target groups 1 and 2.

Target group 1

Children aged six to sixteen mainly from families engaged in agricultural activities and with a low standard of living (in comparison with indigenous upper and middle classes).

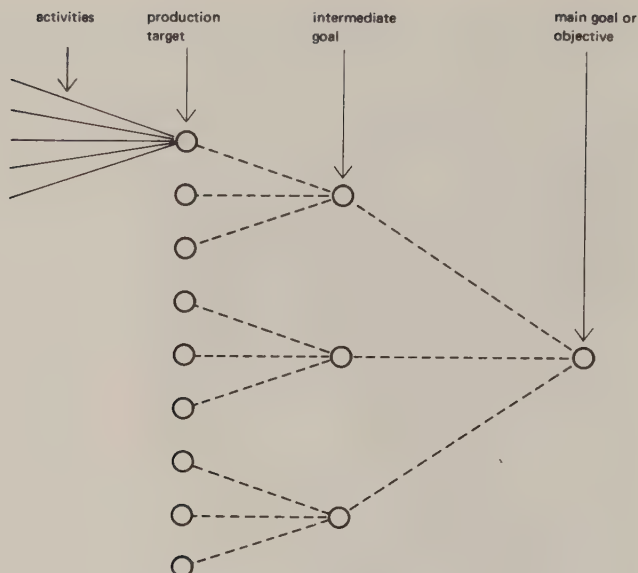


Figure 4:19 The road to the goal of the project:

"Directing, follow-up and evaluation presuppose formulation of the project's main objectives, breakdown of these into intermediate goals, establishment of production targets and activities and the clarification and appraisal of all interconnections.

A simple figure has been chosen to illustrate the connections. In reality the picture is often complex. A single activity may be connected with several production targets, and these may be related to several intermediate goals" (SIDA 1973:20).

Target group 2

The rural population as a whole (mainly comprising persons of low living standard and traditional tasks in subsistence farming or small scale agriculture).

Intermediate goals

1. To increase over a period of five years the proportion of primary school pupils from 11% to 15% of the relevant age groups with special emphasis on target group 1 (Way station: Year 1, x pupils; year 2, y pupils, etc.)

2. To have created within a period of five years, largely on the basis of domestic recruitment, an organisation in the Ministry of Education with a capacity to construct one thousand classrooms per year according to established quality criteria

3. To stimulate and enroll the local population in development co-operation through the establishment of local school committees and the initiation of fund-raising activities

4. To pursue an active employment policy in order to created jobs for the local population in connection with ongoing school construction; which in turn will result in greater employability because of the experience of construction work.

Production targets

1. To construct and equip during a five-year period a total of six thousand classrooms according to quality criteria and costs defined in the work programme together with administrative facilities and sanitary equipment. Of the six thousand classrooms a maximum of two thousand shall be so-called alternative classrooms (this relates to intermediate goals 1 and 4).

2. To train some one hundred day workers per year to become skilled workers and some 20 skilled workers per year to become supervisors (this relates to intermediate goals 2 and 4)

3. To form local school committees which can contribute, through collections, a minimum of y% of the total costs of the relevant school building (this relates to intermediate goal 3).

NOTE: The concept of the production target includes physical results (for example the number of completed classrooms), manpower results (for example the number of trained supervisors) and institutional results (for example the number of functioning school committees).

Activities

To organise the construction work in such a way that production target 1 is reached.

To organise education and training in such a way that production target 2 is reached.

To organise fund-raising activities in such a way that production target 3 is reached." (SIDA 1973:19-21).

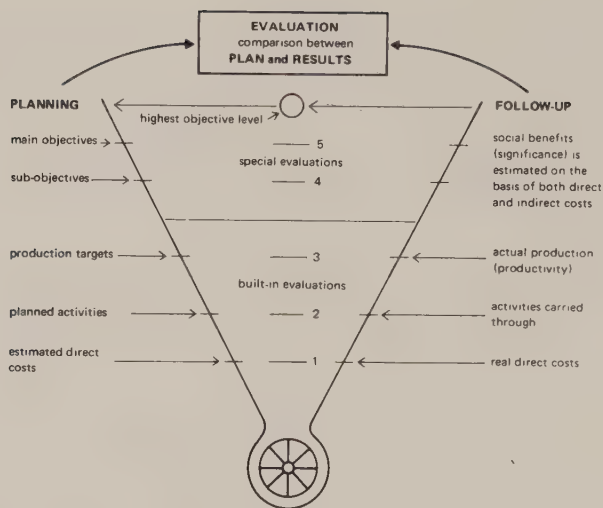


Figure 4:20 A system of evaluation:

"This illustration indicates that evaluation is tied to (partly built into) a closed system of planning and follow-up of the project and the Swedish support for it.

Planning proceeds from the highest level of objectives. When main objectives and subobjectives or intermediate goals have been formulated, production targets and activities are established and defined. Planning moves gradually down to the lowest level and ends in detailed programmes of work and cost estimates.

The implementation of the project and the Swedish support involves the responsibility of following the activity in order to establish the degree to which the objectives defined have been reached without exceeding the estimated costs, attention being paid to the various effects of the activities.

The activities and the follow-up generate experience which is fed back to planning. Evaluation is the comparison of plans and results. At levels 1-3 the evaluation can be done by built-in arrangements. At the higher level special evaluations are usually required" (SIDA 1973:26).

Construction is mentioned only twice in this goal hierarchy of a school building program. Among other things, the creation of "an organization in the Ministry of Education with a capacity to construct... according to established quality criteria" has been given as an intermediate goal. The goal of production, "to construct --- classrooms according to quality criteria and costs defined in the work programme...", recurs. Design of the buildings or organization of construction activity is thus neither regarded here as being a goal in itself, nor as being possible to influence. The construction activity and the building are only expected to conform with established quality criteria and costs defined. If the goal of projects has been formulated in a vague manner from a construction aspect, it will, in all probability, be very difficult to later make a comparison between the original ambitions and the factual result. An evaluation of the building component runs the risk of becoming goal-free. However, it is more probable that the building component on the whole will not become the object of interest for the evaluators.

SIDA's evaluation bureau has later, in a promemoria, formulated a programme of action for the evaluation activity of SIDA (Goppers 1980).

Goppers states that during the 70's it was natural that interest was mainly directed towards goals related to the strong emphasis placed on the country programming philosophy of Swedish aid politics. However, during the beginning of the 80's, the signification of this philosophy has been re-interpreted to a certain degree. The so-called dialogue has assumed greater importance, and the board of SIDA gave the following definition to the National Auditing Board 1980 10 24: "Country programming is presently a working method and philosophy which influences the aim and direction of aid, but not the formulation. SIDA would like to have a say in that matter". In order to harmonize with this rather new aim, Goppers proposes the following objective for the evaluation activity of SIDA during the 80's:

"Since the beginning of the 70's SIDA has concentrated on three different goals of evaluation activity. They are:

1. to contribute to more effective development work by supporting evaluation activity by the receiving countries
2. to effectuate better planning, more effective accomplishment and better attainment of goals of the Swedish aid
3. to account for and inform the Swedish general public about the result of aid." (Goppers 1980:2, our translation).

He later concludes:

"Since goal 1 - to support the receiving countries' own evaluation activity - is still given priority, great ungratified demands within goals 2 and 3 are presently experienced. Evaluations according to goals 2 and 3 are carried out in order to improve SIDA's, as well as to publicly account for the results of this aid. SIDA's evaluation activity should therefore purposely work towards the gratification of these demands. Evaluations should thereby especially be carried out on the project level. At the same time, all possibilities should be employed in order to increase and improve the evaluation activity of the receiving countries. The efforts to support the evaluation activity of the receiving countries are intensified concurrently when the demands within goals 2 and 3 are met" (ibid:3, our translation).

This stresses that the activity ought to aim at programme evaluation according to Franklin and Thrasher's intention (1976). Evaluations should be carried out especially on the project level, which can be interpreted as an understatement because that is exactly where the most emphasis should be placed if SIDA should be able to have a say regarding the practical formulation of aid.

Goppers, in the same paper, proposes a table for SIDA's division of labour regarding evaluation activities. The table shows that the responsibility for evaluations on the project level rests on the sector division or on the aid office in the respective country. The evaluation unit should supply service. With this arrangement and distribution of responsibility, it appears as if there was an obvious risk that the building component would not be evaluated with the attention it deserves. Construction activity lacks its own sector division and is instead placed under the Industry Division. It is not certain that the Industry Division will be called in if, for example, a project regarding elementary schools and education in a rural district should be evaluated.

The Norwegian aid organization, NORAD, has published a handbook for matters of evaluation (1981). It is here stated that buildings and selection of technology are matters which, among many others, ought to be included in the terms of reference for an evaluation (ibid:28). However, no indications of method issues on how this could take place are given, other than that the use of goal hierarchy is warmly recommended. In such a case, a completed building can be regarded as an achieved result on the level above the direct activities (ibid:9). Only general experience from the operation phase can be expected to be dealt with in an evaluation with such clear-cut location of the building in the goal hierarchy.

Evaluation object	Responsible unit	Role of evaluating unit	Goals of aid
A SIDA project	Sector division/ Development cooperation office	Supplies service (and eventual edu- cation) concerning methodology, terms of reference, iden- tification of goals and problems, con- sultant contracting etc.	The four aid- policy goals: a) ... b) ... c) ... d) ... and production goals and other opera- tionalized (con- crete) goals.

Table 4:2 The structure of evaluation activities of SIDA (Goppers 1980).

USAID states, in their handbook "Design and Evaluation of Aid-Assisted Projects" (1980), that the ability to evaluate a project is closely related to the manner in which the goals have been specified from the beginning. These are recommended to be formulated according to an hierarchy of four levels: goal, purpose, outputs and inputs. Moreover, objectively verifiable indicators and means of verification (ibid:59) should be mentioned for every goal of the different goal levels. Such a strict arrangement is, without doubt, of great help when an evaluation should later be carried out. The handbook's strong emphasis on measurable goal accomplishment means, presumably, that other, less concrete goals and results, go possibly unnoticed in the evaluation. USAID emphasizes that an evaluation must concern a whole programme and cannot be limited to the contribution which a private donator represents. "Evaluation must comprehend the total program or project. It is neither feasible nor productive to limit the evaluation process to the fractional resource input of a single source or donor" (ibid:250).

This principal attitude becomes invalid to some degree by the very strong focusing on USAID's own investments, reflected in forms and routines. In spite of this, the handbook does not give us any direct guidance on managing the building component in these programmes.

USAID has, however, through its Office of Housing published Guidelines for Evaluation and Monitoring (1978). These strongly stress AID's necessity for continual monitoring of the projects, and a large part of the handbook states how this should take place during the project development phase and the project implementation phase. From our point of view, the handbook is mainly interesting when it, in the last pages (14-18),

directly deals with Final Regular Evaluations, which could possibly be said to correspond to evaluations of the investment phase, as well as Special Evaluations; Case Studies and Intensive Evaluations. Final Regular Evaluation should "coincide with the estimated date of the end of the project" and should comprise "a comprehensive assessment of the success of the project in achieving its stated Outputs, Purposes and Goals" (ibid:14). The Guidelines state:

"In addition to summarizing the events described in, and the actions resulting from, the series of Annual Regular Evaluations and PPTN (Planned Performance Tracking Network) revisions, the Final Regular Evaluation will focus on the overall institutional and beneficiary impacts of the HG (Housing Guarantee) project. Beneficiary questionnaires administered during the initial stage of project implementation should be readministered on a sample basis and the data derived therefrom compared with the baseline data obtained from the initial questionnaire. Similarly, current data will be developed on the performance of the target institutions and compared with the baseline data presented in the Project Paper.

These data and such other quantitative indicators as may be shown in the LF (Logical Framework) as End-of-Project Status Indicators will then be compared against the quantitative targets expressed in the LF to provide concise statements about the success of the project. For example, the Final Regular Evaluation should state the percent of anticipated, or planned, achievement of the project actually accomplished -- e g, 110 percent of Purpose One, 75 percent of Purpose Two, etc.

The Final Regular Evaluation should also report on the level of Inputs actually required to achieve these performance levels to provide the basis for an assessment of the project's cost efficiency." (ibid:14,15, our underlinings).

It appears that a Final Regular Evaluation principally aims at a control that quantitative goals are reached, as well as giving an idea of the cost efficiency. An evaluation of the investment phase ought to, however, be considerably broader, according to our opinion.

Evidently, this is even the opinion of USAID, who states that "the concept and purpose of evaluation extend beyond systematic and effective project management". Special evaluations can, from time to time, be required. Case studies are therefore a possibility. USAID states that the "principal focus of case studies will be on:

- o Policy development in the shelter sector as an explicit function of government;
- o Actions taken to improve shelter for the poor;
- o The creation and strengthening of housing finance systems;
- o The extent to which existing housing finance institutions are mobilizing resources and applying them in increasing proportions to facilitate access of the poor to decent shelter;
- o The organization and implementation of innovative projects, the extent of their success, and the lessons to be learned from the experience;
- o The extent to which shelter solutions demonstrated by HG projects have been replicated by host country institutions;
- o The manner in which and the extent to which program design has resulted in Goal attainment; and
- o The ways in which shelter programs have induced provision of other services essential to the development of viable communities" (ibid:16,17).

USAID thus feels that a "case" should principally be interpreted as a whole project and its own importance. A conscious division of the experience from the investment and operation phases respectively for a building is not evident.

It is possibly what USAID terms as "Intensive Evaluations", which is the closest to that which we are aiming at. "Their purpose is to determine in a scientific way if a relationship exists between specific shelter program inputs and hypothesized effects" (ibid:18). The description of the organization of such evaluations is, however, very brief and is not complemented with any appendices. It is recommended to use control groups and to concentrate on that which is measurable.

In Germany, "der Bundesminister für Wirtschaftliche Zusammenarbeit" through its Inspection Unit has provided a discussion paper on evaluation, called "the Institutionalization of Evaluation Research - Experience from Government" (BMZ:no date). The recommendations are closely modelled after those of USAID. In an annex, a paper is included on "Problems of Assessing and Documenting the Effects of Projects as part of the Overall Evaluation of Aid by Country". It is based on an overall evaluation of German Aid to Senegal, covering 82 operations since 1961. These were classified in a conventional manner; e.g. farming, health, rural water supply, etc. Some projects were finalized since quite some time, whereas others were still ongoing. This caused considerable problems.

The mission formed to carry out the overall evaluation met with an unforeseen problem:

"The aim of an "ex post" analysis is to give an overall view, but future projections of the evaluation findings also have to be made from the same angle. Consequently the Senegalese government and the MEC department responsible for Senegal projects regarded the evaluation mission from the onset as a preprogramming mission, in other words a mission clearing the ground for negotiations concerning the 1981-1982 biennial programme. The mission attempted to move away from this over-restrictive approach but in the course of meetings with the Senegalese government and the German department concerned it realised that their main interest was specifically to find out whether the current programme should be continued rather than to discuss past achievements" (BMZ:20).

The participation of personnel from an accomplished project in a more general retrospective evaluation can have its drawbacks. The greatest importance is thus placed on the fact that the evaluation seeks answers to questions closely related to the concrete experience which the project personnel have had. It can hereby be less wise to carry out macro-studies based on a large number of widely differentiated projects without delimitation of relevant aspects or components.

The Evaluation Unit of the Overseas Development Administration (ODA), London, has equally its "Guidelines for the Preparation of Evaluation Studies" (1981). These guidelines have a lot to give. They are rather brief and state that "due to the wide range of types of activity evaluated it is not possible in these guidelines to give highly specific recommendations, but the guidelines should be interpreted in the light of the particular activity under study" (ibid:2). This opens the door for the aim of his study: to search for experience of the building component in projects. ODA states, as its Basic Objectives;

"The ODA carries out evaluations with two aims in mind. Firstly, to assess the effectiveness of its aid activities and secondly, to learn lessons for improving the effectiveness of future aid activities. Both these aspects are of as much interest to the recipient of the aid as to the ODA. For this reason ODA's evaluations are always carried out in cooperation with the developing country concerned and whenever possible ODA seeks the direct involvement of the developing country in the evaluation.

Evaluation is not auditing and does not aim to point the finger of praise or blame at particular individuals or institutions. We are interested to know the factors which led either to success or

failure of a particular activity. Lessons can be learnt both from successful outcomes and from outcomes which were less than satisfactory. The lessons which we aim to learn are basically of two types:

- a. Lessons about ODA's procedures and any other administrative aspects concerned with the project, and
- b. lessons to do with the project itself which may relate to the design of the project, the implementation of the project, the beneficiaries of the project, the parameters used in the appraisal, and so on" (ODA 1981:1).

With these types of lessons in mind, it is interesting to make a comparison with "A Guide to the Economic Appraisal of Projects in Developing Countries" (MOD 1977). It is stated in the preface, that "in pursuing its practical objectives, the Guide is less concerned with theoretical niceties than with operationally valid ways of providing the kind of analysis essential if expenditure decisions are to further economic development" (ibid:vii). Furthermore "the general principles set out in this Guide should be applied from the preliminary identification stage right through to final implementation". An important delimitation is made: "There are a number of aspects to project appraisal - technical, financial, social, economic, etcetera - all equally important. This Guide is concerned principally with one aspect only, economic appraisal" (ibid:1).

The guide thoroughly delimits itself in the continued text on economic appraisal, especially on different matters in connection to cost-benefit analyses. However, the checklists included in an appendix aroused our interest. It is said that these checklists give an indication of the kind of information which would be relevant for the appraisal of investment projects following the guiding principles adopted in the Guide. It is furthermore stated that:

"Specific check-lists are provided to cover the main types of project likely to arise (hospitals, roads, water etc.). Two "Common" check-lists are also provided to cover a. the Economic, Management and Financial Aspects common to all projects, and b. the Building and Construction Aspects common to all projects involving buildings. These two check-lists should be used in addition to the check-lists for specific projects" (MOD 1977:72).

These checklists undoubtedly contain a great number of questions which not only ought to be posed on (economic) appraisal of a project, but even ought to be followed up by subsequent evaluation. A clear division between investment and operation costs is made:



Figure 4:21 Appraisal team, including vice-president Mr. Le Bao (dark suit) and author (center), in Hai Phong, Vietnam 1974.

"Where the project is such that a clear construction period, followed by an operating period, can be distinguished, then the costs of construction and equipment should be separated from the operating costs, and be called "investment" costs. Major replacements in later years should then be included as investment costs under the year in which they occur" (MOD 1977:74,75).

It is furthermore recommended that a comprehensive analysis of the need and accessibility regarding a labour force with varied degrees of skill is made, and whether the labour force should be domestic or foreign. Material and components also ought to be analyzed in regard to whether they should be directly imported or purchased within the country, for example, whether the design can be made locally or if it ought to be made by international consultants. Following these general matters referring to Economics, Management, Finance, Building and Construction Aspects, as many as 23 checklists for different types of projects are accounted for. These are divided into three groups: Transport, Services and Production.

Under Services we find, for example, Hospitals, Education and Housing. The lists deal with matters related to the choice of building technique in regard to material and technique, functional design and design of the building process. The division is possibly not quite so strict as we desired in an earlier chapter, but in comparison to the vague and general recommendations for

evaluations given in other handbooks, MOD's division of different types of projects is a giant leap forward.

In a publication on evaluation within the water sector, "Evaluation for Village Water Supply Planning" (Cairncross 1980), we find, for the first time, a corresponding concrete concentration in evaluation guidelines. The publication is well-planned and gives concrete and easily applicable advice for planning and realization of different types of evaluations within the water sector.

The function of evaluation is indicated in a figure as a connection between on the one hand operation and maintenance and on the other, project identification (figure 4:22). From our point of view, we can state that construction is included in the figure as a block, but that it lacks an arrow from this block to evaluation. This relationship is later reflected in the arrangement of the report where a whole series of aspects is dealt with in different chapters, but where construction in particular is lacking. This relationship recurs in figure 4:23, where the manner in which aspects of different chapters can be combined with different types of evaluations is accounted for. However, much later in the publication, in the chapter on Financial Analyses, the consciousness that the construction component must be included in the evaluation recurs. It is there stated:

"The financial aspects of the evaluation will require specialist economic and financial skills. However, the implications for design engineers must be made quite evident, and economic and financial factors brought to bear on their designs. For example, engineers should understand the implication for installed capacity of a switch from strict financing to a subsidy policy (more water consumed) or of an emphasis upon house connections or communal water points (cost and capacity implication). Similarly, cost analysis from an evaluation (chapter 2) should indicate to designers comparative costs of materials (e.g. PVC, steel, and asbestos-cement pipes), or construction technologies (labour-intensive, machine-based) and sources of labour (self-help, direct labour, contractor), of economies of scale in construction, and of related development activities (e.g. resettlement, urbanization, or livestock development) (Cairncross 1980:160).

More general recommendations on how this could possibly take place in regard to the investment phase are, however, not given.

In the next section we shall examine the possibility that matters which especially interest us have, after all, been raised in realized evaluations.

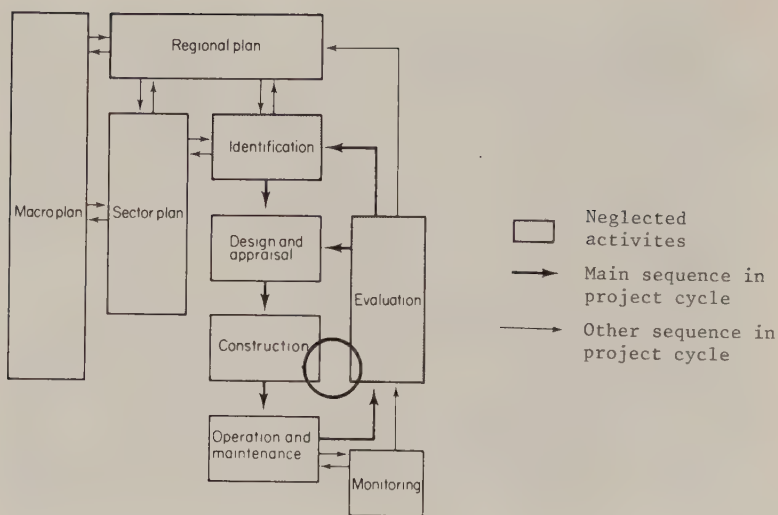
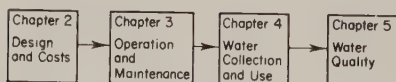
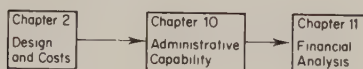


Figure 4:22 Schematic representation of planning activities (Cairncross 1980:2), with lacking arrow indicated.

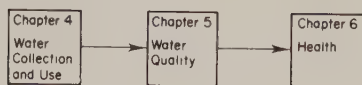
(a) Technical evaluation



(b) Administrative evaluation



(c) Health impact evaluation



(d) Village level evaluation

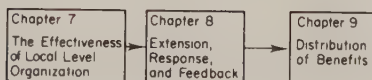


Figure 4:23 Evaluation scope: alternatives employing guidelines from various combinations of chapters (Cairncross 1980:12).

4.4 Case Studies

A series of case studies has been reviewed with the aim of examining the extent to which theories and identified assigned methods are used. These case studies will not be repeated in any great detail here. They are instead compiled in table 4:3-6. The extent to which certain central aspects are dealt with within the different studies has been noted in the tables.

The evaluated projects are located in countries in Asia, Africa and Central America. With few exceptions very poor countries were dealt with. The economic aspect is studied surprisingly little. A proper cost-benefit analysis has only been carried out in some cases, and at that time, the building has a very reserved role in the report. Economy is seen as costs, often in the traditional manner by contractors - actual cost in relation to budget. Most of the reports lack, however, any form of distinct cost account, and an outsider can seldom gain more general experience from this information. Regarding choice of technique, it seems that most of the studies generally recommend local materials and solutions. The matter is not mentioned in all the reports, and it seems that the choice of technique is taken for granted. No feed-back of alternatives which could have existed is thereby made, neither of alternatives which ought to be tested in future projects. The architectural design of buildings is very casually dealt with. Plans are accounted for in many cases, but the actual use is only touched upon in a few cases. Hereby, complaints regarding the given design are mainly registered while overstandards are not registered in a corresponding manner. Alternatives of a more general character are not generated.

A large part of many of the studies is comprised of the process through which the buildings have come into existence. The control of time and costs, management and monitoring are hereby specially stressed. Some of the studies show, in a model manner, how the project came about, in chronological order. This type of report is of value, but cannot independently explain why problems do or do not arise. The ability to generalize is low, and the studies almost lack discussion of whether the accomplishment could have been achieved in another way.

Most of the studies richly contain information on the investment phase. However, the investment phase is mainly regarded as a matter of finance and management. It is seldom shown that this stage concerns a successive product determination, and the alternatives which have been eliminated during this process are not discussed. Thus, it is exceedingly difficult for the reader to judge the way in which the project has been carried out, or to estimate the likely benefit of alternative strategies.

The operation phase is dealt with in many studies. Special maintenance and durability is hereby mentioned, and also the actual use in some cases. A clear division of gained experience during the investment phase and the operation phase is seldom made. This is notable since the building is often under the control of different principles during the different phases.

Defects and errors are usually depicted as being implicit of the programme, that is to say if the regulation and the control had functioned better, the problems would not have originated. A conscious feed-back to the original goals and to a consciously designed goal hierarchy only occurs in a few cases, and such is equally the case concerning stable and variable societal factors influencing the programme. The possibilities to judge whether or not there were theory errors are thereby few.

Finally, it should be said that most of the case studies do not meet any more rigorous scientific demands. The studies mainly have the character of progress reports, and it is not unexpectedly very often the persons closely related to the planning and accomplishment of the project who later on carry out the evaluation. Especially for this reason, it would be of great importance for evaluations to be carried out with greater scientific and, in particular, objective demands. This can be stated even if the example existing among these case-studies on experimental design with control groups has given surprisingly vague conclusions.

Indicators of the reviewed evaluation case studies have been compiled in table 4:3 - 4:6.

Project	Country	Cost	Materials	Architecture	Process	Inv phase	Operation phase	Theory error	Process error	Research design	Comments
Bor, W, et al: "Belompan, Belize, An Ex-Post Evaluation of a New City Aberystwyth, Wales (no date) 11p.	Belize				Chronology	Yes	Yes	Yes		Goal and impact-oriented	A brief, scholarly study where an interest in the evaluation format has been exercised. No effort to substantiate or quantify.
Brisman, J, et al: "Study of Rural Building Development in Botswana", White Architects, Stockholm (no date) 59p.	BOT	Yes but not economy	Yes		Yes	Yes	Maintenance		Yes	Descriptive	The report is preoccupied with organizational and management matters. Construction is seen as a process. In this respect, the report is comprehensive.
Brisman, J, et al: "Inventory of SIDA Supported Building Projects in Tanzania", White Architects, Stockholm (no date)	TAN	Yes but not economy	Quality		Time cost and contracts stressed	Yes			Primarily	Descriptive	An inventory: designed to provide information for desk study evaluation (Dahlistedt, F et al 1980)
Dahlistedt, F, et al: "An evaluation of SIDA Supported Building Projects in East Africa" Stockholm 1980 33p.	TAN KEN	To a limited extent			Management aspects stressed	Yes			Yes	Process review	A desk study based on Brisman, J, et al 1980 and Hansson, L, et al 1980. The stages of the construction phase are reviewed. Conclusions aim at being generally applicable, but not consensus in research team.
Danby, M: "Construction of Glacis Estate, phase II Gibraltar, an Ex-Post Evaluation", ODM, London 1977, 35p.	GIB	Relative costs	Yes	Yes	Yes	Yes	To a limited extent	Yes	Yes	Professional common sense	Provides feed-back information on cost, design and related subjects. Not systematically or objectively.

Table 4:3.

Project	Country	Cost	Materials	Architecture	Process	Inv phase	Operation phase	Theory error	Process error	Research Design	
Ewing, A, et al: Vinh Phu Pulp and Paper Pro- ject - Socio- economic Cost- Benefit Analysis", SIDA, Stockholm 1982, 74p.	VIE	Socio- econom- ic cost- bene- fit				Yes	Yes			Appraisal	Basically an economic appraisal of the future operation of the mill. Indicates no ex-post experiences.
Gilbert, R.T: "An evaluation of ODM Housing AID", ODM, London 1978, 34p.	Sever- al	Compa- risons of cost but not of eco- nomy			Yes	Yes	To a cer- tain extent			Compara- tive analysis	A review on a general level of ODA:s projects 1974-77. Focus on relative costs. Advocates site and service schemes.
Goppers, K: "The Performance and Future Role of SIDA Supported Public Works in Lesotho" SIDA, Stockholm 1981, 36p.	LES	Eco- nomy, not cost			Yes	Yes	Yes	Yes	To a cer- tain extent	Goal- orient- ed	A well structured analysis of the overall economic benefits - if any - of labour based tech- niques.
Hansson, L, et al: "Inventory of SIDA Supported Building Projects in Kenya" White Architects Stockholm (no date) 80p.	KEN	Yes, but not econ- omy	To a cer- tain extent	Little	Time, costs and con- tracts stress- ed	Yes			Primar- ily	Descrip- tive	An inventory, designed to pro- vide informations for desk study evaluation (Dahlstedt, F, et al 1980)

Table 4:4.

Project	Country	Cost	Materials	Architecture	Process	Inv phase	Operation phase	Theory error	Process error	Research design	Comments
Hjelm, S: "Construction of Primary Schools and Community Skilled Centers in Ethiopia" Swedec, Stockholm 1981	ETH		Yes		Yes	Yes	Maintenance		Yes	Monitoring review	Conclusions are made ad hoc.
Kaman, I. J et al: "The Housing Scheme in Thika" HRDU Univ of Nairobi 1972 109p.	KEN	Yes	Yes	Yes	To a certain extent		Yes		Yes	Sociological approach	Compares user reactions regarding two housing schemes. Technical and functional complaints reported.
Nathan, R.R: "A case study evaluation: AID Shelter Programs in the Ivory Coast 1963-76" USAID Washington 1979 113p.	Ivory Coast	Yes	Some		Some	Some	Some	Yes	Yes	Comparative	The focus is an institution-building (housing banks). The evaluation seeks to answer whether the AID-programmes were successful, rather than whether the housing was sound.
Nobis, E: "Evaluation of a Pilot Low Cost Housing Project" Lund University 1970, 42p.	ETH	Yes	Yes	Yes	Yes		Yes		Yes	Ad hoc inventory	House-owners interviewed. No systematic conclusions or recommendations.
Philipsson, C: "SIDA-stödda byggprojekt i Zimbabwe 1980/81-82/83" SIDA, Stockholm 1981 37p.	ZIM	Yes	Yes	Yes	Yes	Primarily		Some	Yes	Ad hoc inventory	A combination of monitoring review and appraisal.

Table 4:5.

Project	Country	Cost	Materials	Architecture	Process	Inv Phase	Operation Phase	Theory error	Process error	Research design	Comments
Ruiz, A: "Housing Guaranty Panama" USAID, Washington 1979 6p.	PAN	Yes			Financing	Yes		Yes	Yes	Project Evaluation Summary (PES)	The PES is well structured and goals, results, external factors etc. are discussed. Focus is on financing institutions.
UN: "Evaluation of the Binational Rural Housing Demonstration Project in Colum- bia and Ecuador" UN, NY, 1977, 60p.	COL and EQA		Yes	Yes	Yes		After 2 years of oper- ation	Yes		Experi- mental design	The evaluation uses experimental design with control group. No methodological details given. Findings vague.
Wamiyoma, F et al: "Survey of Educa- tional Facilities in Secondary Schools and Teachers Train- ing Colleges in Tan- zania", MNE, Dar Es Salaam 1981, 58p.	TAN	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Compre- hension compara- tive inventory	The report is based on informa- tion from a large number of field visits at schools. Information is given in tables. Conclusions not always deductable.
White, D.I: "Survey and Evaluation of Existing School Buildings". UNESCO, Paris 1969	GREN	Yes	Yes	Yes		Yes	Yes		Yes	Inven- tory	Essentially an inventory ad hoc guidelines for future projects

Table 4:6.

5 A FEW ATTEMPTS

5.1 Introduction

In this chapter, a few evaluations will be reviewed. Their common factor is my personal contribution to each and every one of them. However, my role has varied between research assistant, project manager and sole responsible researcher. The subject of the evaluations is also varied. The focus of my interest has been on construction projects, but I have also been responsible for the evaluation methods concerning infrastructural projects and projects on physical planning. Three of the projects are related to Vietnam, one to India and one to - Sweden. There is nothing awkward in the fact that one of the projects concerns Sweden. This is, on the contrary, in line with what has been stated in chapter 4.2. From a methodological point of view, there is no decisive difference between an evaluation of a project in a developing country and in an industrialized society.

Since the projects are thus different to their character and geographical distribution, the comparative analysis will generally follow the theoretical framework given in chapters 3.7 and 4.2. The description and analysis will, however, be somewhat more comprehensive. The stress will be placed on the methods used and the degree to which the findings of the evaluations could possibly be generalized.

In this chapter, the projects as such will not be fully described. The interested reader is recommended, firstly, to read the excerpts of the reports (annex 1-5). Secondly, the evaluation reports in themselves can be recommended for further studies.

5.2 Emergency Housing

In 1973, the D.R. Vietnam requested assistance from the International Red Cross (IRC) regarding emergency housing. Before the end of 1974, approximately 4 000 housing units had been delivered and most of them were built. These buildings came from four producers in Finland, Japan, F.R. Germany and Sweden. The total budget for the programme of the IRC amounted to 20 000 000 SFr. The housing units were built in a large number of places in most of northern Vietnam. About 40 000 persons were already living in these houses in 1975.

The four types of buildings were constructed of widely varied materials; one type was entirely built of steel structures and steel sheeting, another of wood with a low degree of prefabrication and two of wall-sized wooden units. However, the lay-out of the buildings was generally the same, following designs made by Vietnamese architects to which the producers and their architects had to adapt their buildings. The process of con-



Figure 5:1 The Finnish house-type.



Figure 5:2 The Japanese house-type, improved with local bricks for walls.



Figure 5:3 The German house-type.



Figure 5:4 The Swedish house-type.

struction of all the building types followed the same pattern, with prefabrication and transport to Vietnam by the producers, to the same harbour, and subsequently local transport and assembly taken care of by the local authorities.

In the execution of the project I had the role of one of the architects responsible for the design of the Swedish house-types and its adaptation to the specific demands of production and transport. In Vietnam my role was construction advisor and coordinator for the erection of the prototypes. Later, I was commissioned to carry out a technical follow-up mission, reviewing approximately 50 % of the buildings at their sites.

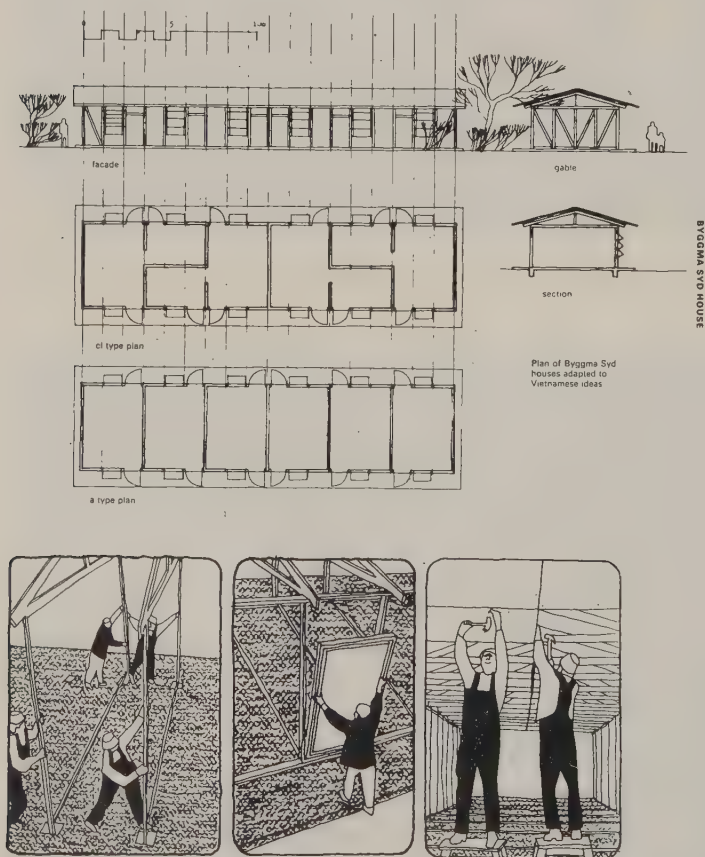


Figure 5:5 Designs for the Swedish house-type, and illustrations from the erection manual.

The evaluation was made in 1975-76. It was entitled "final report" and there is stated that the aim of the evaluation was "firstly to inform the ICRC (International Committee of the Red Cross) and the league, as well as the National societies and Governments who contributed to its implementation, on the development of the project and the experiences gained. It may also be of some interest to the Governments, organizations planners, administrators, constructors, technicians and manufacturers meeting situations involving similar problems to those described here" (IRC 1976:3).

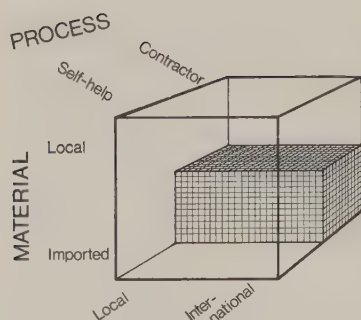
Thus, the primary aim of the report was to transfer information back to those who had financed the project. The aim was nevertheless, that these experiences could prove to be of a more general interest. It was believed that it would be possible to make conclusions of a more general validity, and that these could prove useful when new projects were to be planned in the future, possibly in entirely different countries and under other conditions and by other agencies. The "final report" thus clearly aimed at being an evaluation based on objective information.

The work with the evaluation was directed by Mr. Olof Stroh, at that time Director of the Red Cross Indochina Operational Group. The information was gathered by Mr. Andre Teikmans and others. My role was that of research assistant; to provide basic information through site visits in Vietnam and to write draft texts.

The evaluation was not carried out with specific scientific aims. Nevertheless, it provides a fairly clear analysis of the goals of the project. These are given in order of priority. The degree to which the goals were achieved is discussed continuously in the text. The evaluation is primarily descriptive in its character and chronologically describes the inception, development and implementation of the programme. The evaluation frequently provides information on non-selected alternatives. In this way the reader is given opportunities to judge whether the decisions made were sound. However, this is somewhat hampered by the partial character of the evaluation.

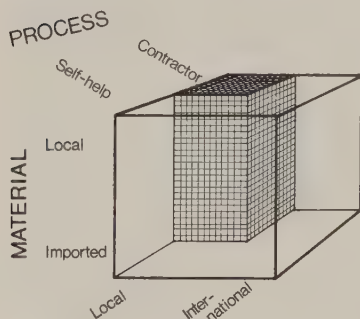
The evaluation is based on a comparison of the four different building types. In an annex, the building types are described separately, both technically and with regard to process of design, production, transport and erection. The report is neither based on interviews nor on information from the users. The receiving authorities have instead, to a certain extent, participated in the evaluation and recorded their experiences and conclusions.

The evaluation is solely concerned with the investment phase and it was carried out immediately after the end of this phase. Any systematic evaluation of the buildings in use has not yet been carried out.



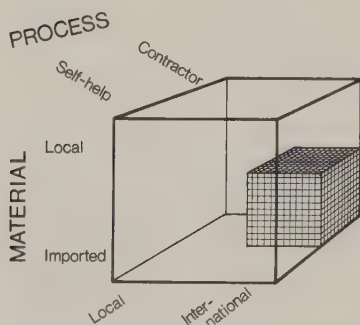
ARCHITECTURE

Figure 5:6 The dimensions of building technology for the Finnish house-type.



ARCHITECTURE

Figure 5:7 The dimensions of building technology for the Swedish and Japanese house-types.



ARCHITECTURE

Figure 5:8 The dimensions of building technology for the German house-type.

The following conclusions were made:

"The main interest of the project for the future is to be found in the way in which analyses, decisions, implementation and current evaluations have been made during the elaboration and the realization of the project. This remark in no way reduces the importance of the technical experience thus obtained. It merely indicates that it is possible that technical solutions and experience may not only result, but stem from non-technical factors.

The view of the Vietnamese on this subject and their cooperative spirit are clearly set out in the present Report. From the Indochina Operational Group's point of view, the following conclusions may be drawn:

- The cooperation with the Vietnamese Red Cross, authorities and experts was most satisfactory. It made it possible right from the beginning to define the common objectives while taking into account the condition governing the project in Vietnam as well as abroad;
- The Vietnamese had to face difficulties, such as the uncertainties in delivery delays and other problems concerning transports and construction (these questions briefly dealt with here are taken up again further on in greater detail). The Vietnamese met these problems with efficiency and showed understanding towards their IOG partner;
- The Vietnamese planning provided a very satisfactory foundation for the IOG in defining technical specifications;
- It seems obvious that only a small number of constructors and manufacturers are accustomed to answer rapidly to non-routine requests;
- It seems also that standard dimensions of industrially-produced building materials do not entirely correspond to specific needs;
- Cooperation between National Red Cross Societies and the governments giving the necessary resources was excellent. With a few exceptions, National Societies respected the conditions which had been fixed.

In this connection, I think that the ICRC, the League, National Red Cross Societies as well as other organisations could profit in matters of relief from the experience thus acquired" (ibid:11).

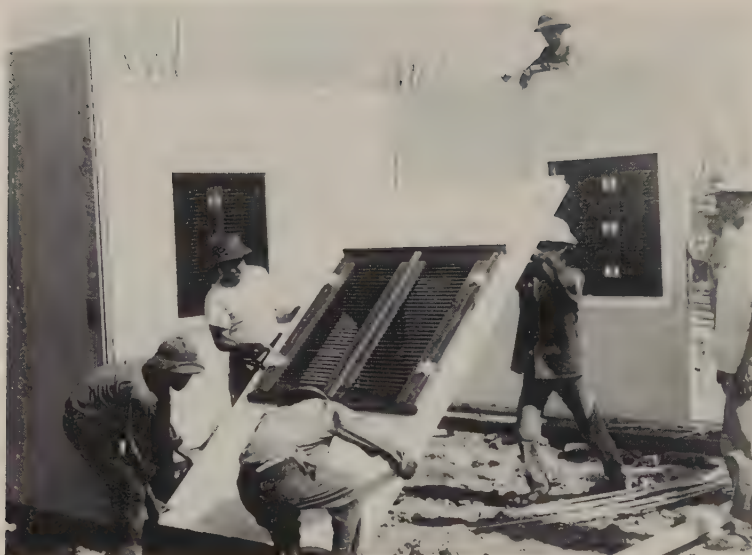


Figure 5:9 Erection of the German house-type.



Figure 5:10 The Japanese house-type was designed to have steel sheet wall cladding, but this was often replaced by local bricks.

These conclusions could be said to be related to the dimensions "architecture" and "materials". The major part of the report is, however, concerned with questions related to the process of the project. The very manner in which the relief operation was conceived has no doubt had an important impact on the buildings procured and the selection of materials. The process could thus be said to have dominated the other two dimensions. Indeed, the original request from Vietnam to the International Red Cross was in regard to cement and reinforcement bars only, to be used freely by the local construction industry. Such a relief operation design was, however, not considered acceptable by the IRC, and especially not by the National Red Cross societies who raise the funds. The project had to meet the criteria of "inaugurability".

It was not possible to arrive at a genuine joint report, and for this reason, the Vietnamese side made some complementary remarks:

- "1. The IOG programme for prefabricated houses was launched according to the principles stated in (the programme).

Urgency being the primary factor, the most important criterion was the supply of material and the building of houses in the shortest possible delay. During the years 1974 and 1975, between 3 and 4 % of the housing problems caused by the war in North Vietnam were solved through the building of 67 000 square metres of dwelling area. This is an appreciable result.

Taking into account living conditions in the postwar period, these prefabricated houses entirely met with the needs of the inhabitants.

2. To obtain these results, efforts on the Vietnamese side (supply of infrastructure materials through their own channels, setting up of supplementary equipment such as kitchens, toilets, laying out of roads, transportation, execution of work, etc.) had to go on a par with foreign assistance.

The Vietnamese are unanimous in expressing their appreciation of the important contribution represented by this IOG assistance programme. They agree that it is thanks to the close and efficient cooperation between IOG and themselves that these prefabricated houses could be set up so rapidly.

3. As regards the practical experiences made during the implementation of this programme, the Vietnamese noted that if the possibility of

getting supplies through their own channels had been correctly assessed in 1973, and if the cooperation between Vietnamese experts and manufacturers and IOG experts had been still closer, more economical and more appropriate solutions might have been found for the structure of partitions and framings. These building materials as well as the material intended to protect the partition walls might have been provided by the Vietnamese. Thus, resorting to building material of Vietnamese origin would have had the advantage of reducing the volume of transports; this would also have been the case with the products intended for the protection of the walls (such as bricks, etc.) which are more suitable to Vietnamese atmospheric conditions. A better adaptation of the houses to the environment could also have been effected.

The Vietnamese contribution would thus have been more marked. But it must be conceded that such a procedure would have required more time and that an emergency housing project to fulfill postwar requirements cannot be carried out with slower methods.

4. Practice has shown that in the construction of these prefabricated houses, further studies on wall protection are indicated.

Acoustic and thermic insulation should also be re-examined, as well as protective coating against dampness.

Moreover, ways should be found for harmonizing the houses with their surroundings.

The UNICEF school project benefitted from some experience made in the above areas. The Vietnamese wondered if the designers of these houses would easily accept some modifications. It appeared that certain changes would not affect manufacturers.

5. The introduction of these prefabricated houses fits from now on into the housing programme in Vietnam, in which during this postwar period two types of buildings are used: a) construction of durable houses of several storeys, especially in towns and cities; b) construction of one-storey temporary houses correspond to the second method and are very well adapted to the development of building industries in Vietnam.

Manufacturing of elements in wood and bamboo will be industrialized in Vietnam, and this industry offers some prospects for the near fu-

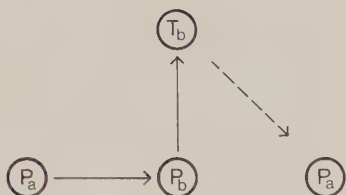


Figure 5:11 Experiences gained from the Red Cross project influenced requirements to be met by the building technology of a later, Unicef-supported project.

ture. Seen under this angle, the fitting up of IOG houses gives valuable indications as regards Vietnamese prefabricated houses. This is the important aspect of the IOG housing programme from the technical point of view. Indeed it may be said that the development of the building industry in Vietnam and IOG assistance joined up at the right moment.

The Vietnamese warmly thank the IOG organisation, the experts, the builders, the various Red Cross Organisations, the governments and the peoples of the countries who have contributed to this emergency housing project" (ibid:14,15).



Figure 5:12 Swedish house-type under construction in Go Dam, Bac Thai province.

The conclusions of the report were not deduced in a formal way. Instead, the major part of the report consists of an annex presenting the various stages of the programme in detail. This is done individually for the four types of buildings, thus providing an ample chance for the interested reader to judge for himself (see also annex 1, IRC 1976:5-11).

5.3 School Construction

During the years 1975-78, UNICEF supported Vietnam in the construction of primary schools, among other things. The programme comprised of 3 582 classrooms in 479 buildings and was finalized during 1979. The total cost to UNICEF was \$10 420 000, and to Vietnam, some 44 140 000 dong. The buildings were of four different types, ranging from totally prefabricated Swiss schools in two storeys to locally designed, simple one-storey buildings. The schools were built virtually all over Vietnam, widely distributed in most of its provinces. It has been estimated that some 350 000 pupils have benefitted from this programme.

The first phase of the programme consisted of 200 pre-fabricated buildings in two storeys with ten classrooms each. They were designed to allow for flexibility, with

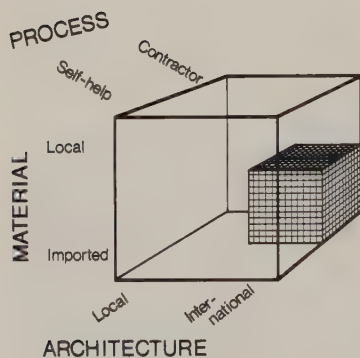


Figure 5:13 The dimensions of building technology for the first phase (1975) of school buildings.

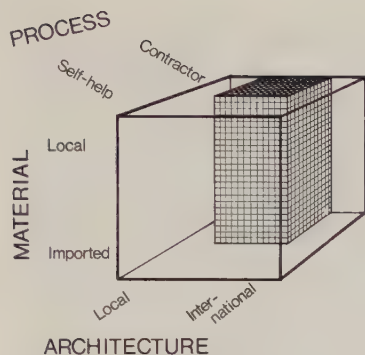


Figure 5:14 The dimensions of building technology for the second phase (1976) of school buildings.

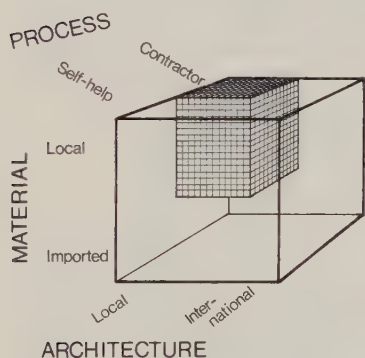


Figure 5:15 The dimensions of building technology for the third and fourth phases (1977,78) of school buildings.

interior walls of "Durisol" panels, which are easily movable within the steel structure of the building. This phase had an experimental character. The second phase comprised 134 buildings with 8 classrooms in two storeys. This building type also had an independent imported steel structure, but all walls were made of locally produced bricks. The buildings were designed in close cooperation between Vietnamese architects and UNESCO/UNICEF consultants. The third phase was the first to be built in southern Vietnam, and comprised of 200 buildings in one storey, 1 000 classrooms in all. This building type was a simple, locally designed structure constructed almost entirely with local materials. The UNICEF input was restricted to such building materials which could not be found within the local community.



Figure 5:16 Trung Nhi school, first phase (Hanoi).

The fourth phase was also designated for the southern part of the country. It consisted of 1 000 classrooms in 125 two-storey buildings. These were designed by Vietnamese architects, and the UNICEF input was restricted to certain crucial building materials.

In spite of the differences between the phases, they were generally carried out according to the same pattern of cooperation. The UNICEF provided building materials to suitable ports, and the Vietnamese side undertook all local transport, planning and construction activities.

My role in the project was to coordinate the execution of the second phase and to monitor the programming of the two last phases.



Figure 5:17 Second phase school under construction (Hanoi).



Figure 5:18 Phuoc Bui school third phase (Dong Nai province).

The evaluation was made in late 1978. The objectives of the evaluation were:

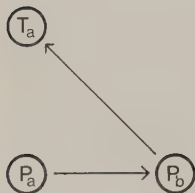


Figure 5:19 In the first phase of the school building programme (1975), a standard pre-fabricated building system was used. Experiences from the implementation led to a new strategy...

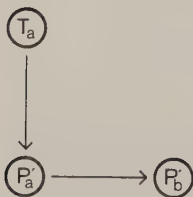


Figure 5:20 ...which was employed in the second phase (1976), but this effort to develop and adapt the transferred technology made it clear, that...



Figure 5:21 ...the best alternative was to resort to locally, well-known designs and materials in the last phases (1977,78).

1. To provide a base for future activities of UNICEF in Vietnam within the domain of primary education
2. To acquaint those wishing to aid primary school construction in the future with the experiences gained during the investment phase of this programme
3. To provide base-line information to a joint Vietnam - United Nations working group on planning of school buildings.

The evaluation was carried out by a Vietnamese group of experts in cooperation with UNICEF consultants; Mr. Almeida, UNESCO, Mr. Yokoyama, Etob, Geneve, and myself, Lund University.

The evaluation only covered the investment phase and was not designed in a strictly scientific manner. Certain information provided was not easy to control, and the involvement of non-convertible currencies made a full economic analysis difficult. Nonetheless, the basic information obtained was given in full in a technical annex, thus giving the reader ample opportunities to check the validity of the analysis and the conclusions.



Figure 5:22 The main goal of the Unicef programme was to provide classrooms.

The main goal of the programme - to provide classrooms - was related to the cost incurred to the two sides. The sub-goals, among others to provide information on modern construction techniques and school planning, was dealt with by dividing the main report into four chapters; architectural aspects, technical aspects, cost aspects and management aspects. These aspects were thus comprehensively discussed, including options not chosen. Theory errors were discussed along with process errors. The conclusions were made by the UNICEF/UNESCO consultants, all of whom had participated in different ways in earlier phases of the programme.

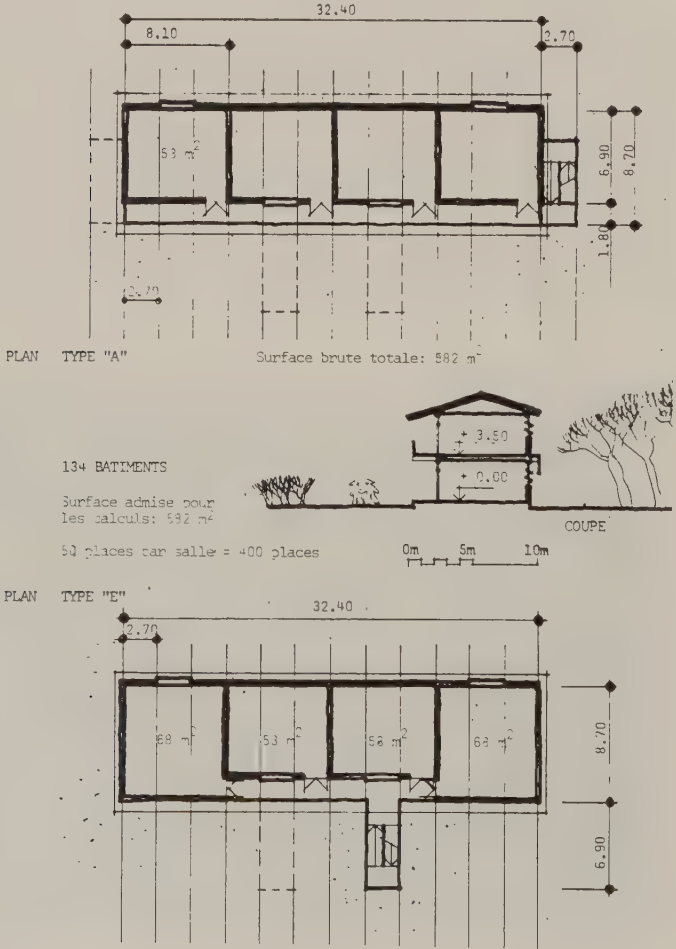


Figure 5:23 Designs showing a second phase building

The evaluation does not contain any information from the use of the buildings or the users (the operation phase), but is solely focusing on the investment phase. At the time of the evaluation, the buildings of the first phase were recently inaugurated, while those of the last phase were still under construction. The timing of the evaluation was directed by the donor, who wished to obtain early feed-back in order to guide a possible subsequent phase and to obtain base-line information for a cooperation on school planning and design. The use of these schools (the operation phase) has not yet been evaluated.

The conclusions of the evaluation are given in full (in French) in annex 2 (Almeida 1983:28-32). They could be said to cover the three dimensions of architecture material and process. The evaluative criterion par preference was the relative cost. The base for the evaluation was thus a continuous comparison between the programmes, and the underlying assumption was that the influence of environmental factors could thus be controlled. During the period 1975 to 1978, the general conditions in Vietnam, or within UNICEF, did not undergo any dramatic changes.



Figure 5:24 A second phase school in Quang Ninh province.

5.4 Water Development

In 1971 the Lutheran World Federation started to drill for water in the state of Madhya Pradesh. During the next decade a total of 1 577 wells were drilled, mostly for rural villages. About 80 % of the wells were equipped with handpumps. In addition to the mere well-drilling, the WDP (Water Development Project) formed teams for determining well and aquifier properties as well as for installing pumps and repairing. The operation developed, and in 1977 the WDP began a "Marginal Farmer Scheme". The focus of the programme was to be redirected back to farmers with only a small landholding. The budget was some 5 000 000 Rupies in the budgetary year 80/81.

The drilling started with smaller drilling rigs. As the programme developed, larger rigs were purchased. These were no doubt more reliable and efficient. On the other hand, they depended on good roads for transport. The diameter of the borehole was also larger, which increased cost. These holes were in general more suitable for large irrigation schemes and pumps powered with electrical or diesel engines.

The "Marginal Farmer Scheme" aimed at re-directing the focus of the programme to the needs of the poorest farmers. A small, easily disassembled, narrow-gauged drilling rig was purchased. The drilling activity was at the same time complemented with initiatives in financing as well as information to these farmers often living in remote and isolated villages. The bigger drilling rigs were instead used for drilling on a contract basis, and were supposed to generate an economic surplus to be used for less well-to-do farmers. However, the contract drilling failed to generate any profits.

The evaluation was carried out in 1981 (Hahn 1981). The scope of the study was to examine the WDP with regard to:

- "- the activities performed by WDP during the last decade with special emphasis on analyzing efficiency compared with possible alternatives and modifying factors outside the control of WDP.
- the results and their relation to stated goals of the Project.

The study is primarily based on an analysis of the technical performance of the Project. The technical aspects are, however, related to social aspects as well as health aspects, which were covered through field visits and literature.

The study does not primarily intend to provide a critical revision of the performance of WDP, but

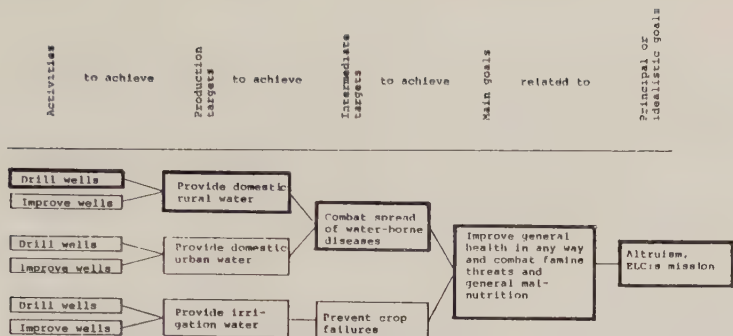


Figure 5:25 Goal hierarchy indicating the focus of the evaluation, corresponding to the main activities of the Water Development Programme.

rather to give a feed-back of experiences from 10 years of operations that could serve as an input to the planning of future activities of the WDP or other projects in the same subject area" (ibid:2).

The evaluation was the result of team-work. The main responsibility for the evaluation was taken by Mr. Hahn, Division of Environmental Engineering, Department of Water Resources Engineering, Lund University. Ms. Linnea Andersson-Hahn contributed to certain chapters. My role was to design the study and especially to suggest suitable methods and research designs. I was particularly involved in the chapter on the conclusions of the evaluation, where the goals of the project were analyzed. These were related to the results obtained and the efficiency in obtaining them.

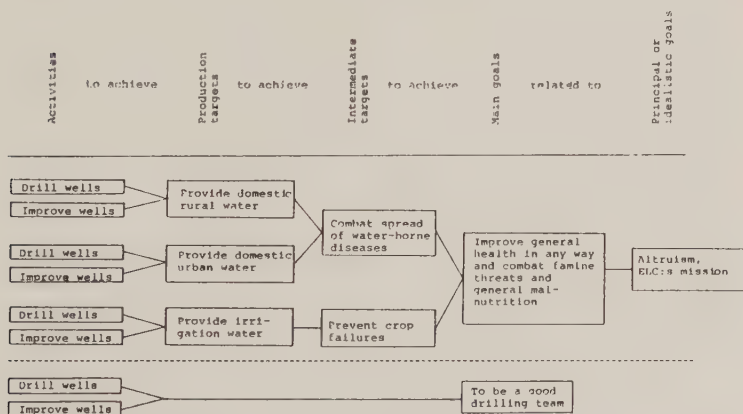


Figure 5:26 Goal hierarchy according to project document and below dotted line, according to employees.

The evaluation is based on studies of the drilling statistics, visits to Betul and its surroundings and interviews with the project management and the staff. The drilling statistics and the biological and chemical quality of the water was analyzed in 55 randomly selected villages. Two villages - one with a tube-well and one without - were studied in detail with special emphasis on the health aspects of water and on the social aspects in general.

The evaluation design was to analyze the goals of the WDP and to organize them in an hierarchical manner, and then to relate the results obtained - voluntary or not - to these goals.

The concept of the goal hierarchy was borrowed from SIDA (1973). The study ran into rough waters at an early stage because the goals of the WDP were not identified by the project management in any detail until the budgetary year 1979/80. The evaluation team had to set up and identify the goals and the hierarchy of these goals, based on annual reports and other available written documentation. The main goal was identified as being to provide clean domestic water to poor rural villages, thus improving the health of the inhabitants.

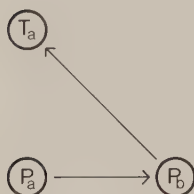


Figure 5:27 Standard pumping equipment was transferred. However, the evaluation found that the durability was not quite adequate...



Figure 5:28 ...and therefore, research was initiated in order to develop improved pumps.

This main goal was, however, somewhat controversial since it meant that the evaluation could only cover wells for village drinking water with handpump installations, and that wells for irrigation, industrial or other purposes were excluded.

The evaluation covers the investment phase and the operation phase alike. For this reason, certain problems had to be overcome in regards to the hierarchy of goals. The goals of the investment phase were reduced to "activities" whereas the goals of the operation phase were considered to be on a more elevated level. Such a concept is no doubt quite common, but does not lead to a more thorough analysis of the two phases independently. The conclusions of the evaluation are given in full in annex 3 (ibid:73-85).



Figure 5:29 Provision of fresh water was not sufficient to improve health, partly because it increased the drainage problem.

In short, the study found that the major activity of drilling wells had been carried out in an efficient manner and with good general results, from a technical point of view. It was, however, concluded that only drilling and maintaining wells could not be considered sufficient in having a significant impact on the standard of health. Other complementary contributions were necessary.

The evaluation discussed theory and programme errors alike. It did, to a limited extent, discuss the suitability of the utilized equipment. Some suggestions for complementary hardware were made. The concept of the dimension of "architecture" is clearly not applicable to this project. The process was instead discussed in greater detail, and the interest of the donors and the employed personnel proved to be of greatest importance for the design and the results of the WDP.

The evaluation report was not a joint document, but a clear-cut report from Lund University. This, of course,

gave the evaluators considerable freedom to express their opinions. On the other hand, it meant that the receiver of the report did not feel obliged to accept the conclusions. Indeed, the LWF did commission a second evaluation contract to an Indian consultant. Hopefully, his findings were more suitable to the commissioner.

5.5 Hospitals

During the year 1973, a cooperation between Sweden and Vietnam was commenced within the health sector. It comprised, among other things, the construction of two hospitals. In Hanoi, a Children's Hospital was built and in Uong Bi, Quang Ninh province, a General Hospital. The two hospitals were inaugurated in 1980-81 and provide modern facilities for diagnosis and treatment. They have 400 and 320 beds respectively. Some depart-



Figure 5:30 The Childrens' Hospital, Hanoi.

ments, such as the wards, are utilized beyond the designed capacity. The total budget for the Swedish contribution, including the commissioning stage, amounts to some 300 000 000 SEK. The cost to the Vietnamese side is not known.



Figure 5:31 The General Hospital, Uong Bi.

The two hospitals have been programmed by the same Swedish architect in consultation with Vietnamese colleagues. They were designed by two independent Swedish consultants in equal consultation, and the monitoring of the construction, equipping and commissioning was entrusted to a Swedish building management company. The responsibility for the construction was, however, on the Vietnamese side. The buildings have been designed to conform to "modern" concepts on hospitals and health care, and the installations and equipment meet high contemporary standards. The ward buildings are eight and five storeys respectively, and the service facilities are generally located in two-storey pavillions.

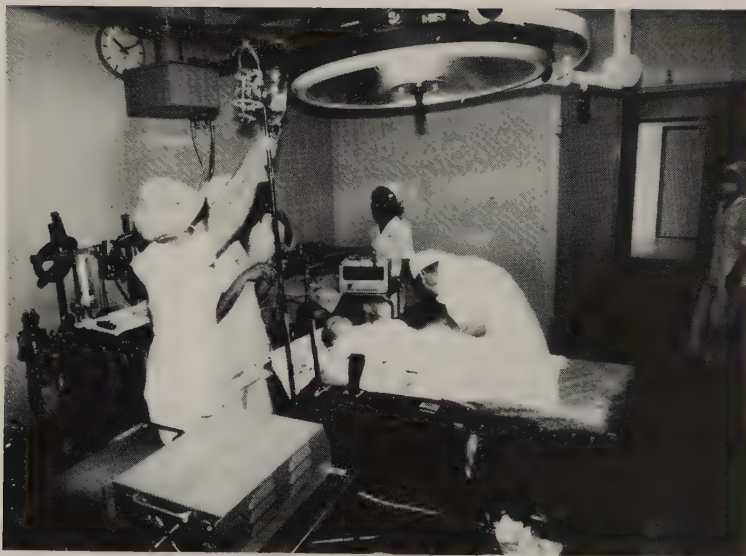


Figure 5:32 Fully equipped operation theatre in the Children's Hospital.

The evaluation was carried out in 1981 (Reuterswärd 1982). It did not aim at judging decisions and actions in retrospect, but rather at bringing forward and, if possible, providing the experiences gained during the investment phase in such a way that similar future projects in international development cooperation could

- achieve the same functional properties with less resources, or
- become better adapted to the set goals and the existing realities.

The design of this evaluation was based on the experiences gained from the evaluations described in chapter 5.2-5.4. An essentially different approach was attempted. There was no thorough description of the design, the materials used or the process of construction. Instead, the evaluation was organized as a seminar where Swedish experts were brought together to exchange experiences. To prepare for this seminar, a form was given to the selected participants. This form was carefully designed. It was centered around different levels of the official goals which SIDA had presented to its board at the time of the initial investment decision. These goals were re-organized into an hierarchy, and the participants were asked to answer in writing the following six questions in relation to each of the goals. The questions were derived from Nilstun (Edlund 1981):

- What efforts were made to achieve the goal?
- What was the result?
- In what way does the result deviate from the goal?
- Why did the efforts provide this result?
- Were the efforts efficient in achieving the goal?
- How should it be done next time?

The aim was that a similar evaluation of the investment phase should be carried out by the Vietnamese side, but this has not yet come into being.

The written answers to the questions in the form were processed so that the participants' experiences in relation to the different goals could be compared. The answers were furthermore compared with the role which the respective participant had had in the project. From this it could be deducted that most participants within a category were fairly unanimous, whereas there were certain significant differences between the categories. These conclusions were then presented to the participants at the seminar.

At this seminar, it was possible to arrive at a rather high level of consensus as to the relation between goals and results, as well as in regard to the causes for the outcome. The evaluator could thus limit himself to generalizing the findings of the seminar.

This was done under five headings:

1. "Aid to Whom?", under which it was concluded that it was essential to focus not only the programming of a project but also the monitoring on the end receiver of the aid, rather than on the executing agencies in the receiving country.
2. "Agglomeration of Knowledge", where it was stated that knowledge is accumulated during the execution of a project, and it is thus imperative that the implementation is designed to be flexible and open for such new knowledge. This means, a.o. things, that there should be a conscious strategy for the choice of technology, leaving lower-level decisions to be made as late as possible.
3. "Transfer of Knowledge", meaning that the agglomerated knowledge should be passed on from one phase to the next in order to maintain a high degree of fidelity to the initial goals and ambitions within the project. It was equally concluded, that knowledge gained in one project should be used in a better way in other projects. To achieve this, heavy responsibility lies on the donor agency and the consultants.



Figure 5:33 Sub-tropical architecture? Central heating was provided, but not always adequate sun protection.

4. "Construction in Aid". Under this heading, it was concluded that the investment phase of construction projects particularly seemed to be less well-adapted to the concept of goal hierarchy given in the "Manual of Support Preparation" (SIDA 1973). The activities of the investment phase could not be seen as parallel, but rather subsequent.
5. "How to Proceed" included recommendations for the future monitoring of the hospitals. Eventually, the operation phase of the hospitals should be evaluated, making use of the findings from the investment phase. Such an evaluation should, however, be made jointly by the Swedish and the Vietnamese. It was also stated that evaluations

could usefully be done regarding other construction projects, but that the methodology should be further developed.

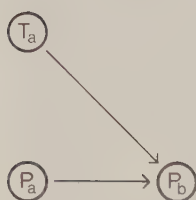


Figure 5:34 Sophisticated and conventional building technology was transferred in the hospital projects. Efforts were made in order to integrate know-how into the Vietnamese society, but it is doubtful whether that will come into being.

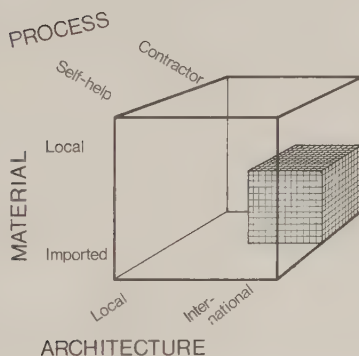


Figure 5:35 The dimensions of construction technology applied to the hospital projects. The chosen combination of dimensions was not particularly innovative.

This evaluation was clearly limited to the investment phase of the two hospitals, and benefitted from the possibility to make comparative analyses. The dimension "architecture" was not discussed in relation to the use, but rather to the design process, the division of responsibilities and the agglomeration/transfer of knowledge. The dimension of "materials" was discussed, but the focus was on the "process" of the projects and the way in which this had come to govern the end result.

The employed method attempted to profit from the vast source of information represented by the actors involved in the project. They had been occupied with it on a

full-time basis for an average of more than two years. Their experience could, to a certain extent, replace the costly descriptive efforts otherwise common in evaluations. On the other hand, the lack of such a descriptive effort limited the usefulness of the report for readers outside the group of persons already familiar with Swedish aid in general and with these projects in particular.

At present, an expert team is set up to evaluate and monitor the operation phase of the hospitals. Hopefully, the findings of the evaluation of the investment phase can be utilized by this team (annex 4).



Figure 5:36 Butul-rubber membrane for roofing is costly and initially efficient. Maintenance with locally available resources is, however, difficult.

5.6 Regional Action Planning

During the years 1978-82, a study circle project entitled "In the Glass Empire - the People - the Environment - the Future" was pursued. It was a result of a cooperation on a regional level between the Workers' Educational Association and the Factory Workers' Union, within the Swedish Labour Movement.

It covered the region having the major part of the Swedish crystal glass handicraft industry. The aim of the project was to improve the region's situation and particularly to enhance the prospects for the future of the manual glass industry. More than four hundred per-



Figure 5:37 Production hall around 1962 at Sandvik, Hovmantorp, for Orrefors crystal glass (photo credit: Workers' Educational Association).

sons had participated in the circles, which covered the history of the glass workers and the glass industry separately from the future of the industry. The future-oriented circles especially included studies of regional and local physical planning.

The evaluation (Johannisson, 1982) was made when the project was almost finished. The aim of the evaluation was "to give rise to knowledge of the extent to which the study circle project has contributed towards the citizens' possibility to participate in changes in their community. The main motive of the evaluation should be the aim for progress, and should set guidelines for an eventual continuation of the project "In the Glass Empire", or for corresponding projects in relation to other matters" (ibid:92).

A working group carried out the evaluation. Ms. Nyström, LCHS, was in charge of assembling the documentation and information in general, and in particular for the circles dealing with the history. Mr. Johannisson, University of Växjö, was in charge of the industry-related matters, and in particular the circles dealing with the future. My role in the evaluation was that of project manager and I was also responsible for the design of the evaluation and the methods used. The evaluation was guided by a multi-disciplinary reference group.

The evaluation was mainly based on a survey answered by a random sample of participants, and on documents from



Figure 5:38 First self-help housing unit, built by glass industry workers in 1906 at Sandvik
Photo taken in 1910 (credit: Workers' Educational Association)

the project. Structured interviews were made with key persons and randomly selected circles. The findings thus obtained were related to an in-depth analysis and interpretation of the goals of the project. The goals were organized in an hierarchy and the results were then compared with the aims.

The evaluation found, in summary, the following:

"The participants of the circles, as well as the project leaders, are, on the whole, positive towards the new working form which has been tested in the study circles. there are, however, both positive and negative experiences from the work in the circles. In the history circles it was appreciated to have the chance to take part in the circle and to learn how the workers lived and worked in earlier times. In the future circles it was considered meaningful to be able to discuss openly, to have respect for each others opinions and cooperation. It was found that the most important factor in the history and future circles was the ability to give rise to something and create something, for example, write a report or conduct a constructive dialogue with the authorities."



Figure 5:39 The region of the Glass Empire was stagnating, and self-reliance was to be enhanced (Emmaboda).

The negative factors were that few women and young people took part, and that there was a shortage of time in making out the reports.

Furthermore, the study circles considered the study material to be insufficiently adapted to their needs.

It can thereafter be recommended that one ought to strive after longer duration of the work of the study circles. Experience and results from previous years ought to be interwoven with the on-going activities. It is also important to broaden the recruiting in order to be heard in municipalities and by others. In order to bridge the problems in systematizing the work, one should take better advantage of earlier research and documentation. Furthermore, it is important to continually conduct a discussion of goals. The free form shouldn't imply that the work lack goals.

An evaluation could come about in many approaches and therefore interpret the results in varied ways. The degree of success or failure can seldom be determined. We have therefore presented two different perspectives on how the results of the study circle project can be interpreted. The first interpretation points to the fact that the project seemed culturally regenerating and has created self-reliance. The other interpretation states that the circles weren't successful in developing a local strategy in order to save the jobs in the Glass Empire" (ibid 93, 94).

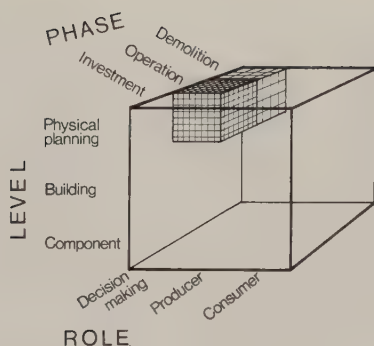


Figure 5:40 Combination of participation dimensions for the "Glass Empire" project. Densely-checked area indicates most relevant box.

The project "In the Glass Empire" was not related to construction or to developing countries. Nonetheless, it was concerned with physical planning - an important prerequisite for construction - and the situation for a peripheral region, such as the Glas Empire, in relation to the center of Sweden. This is not altogether different from that of peripheral regions in developing countries. From this point of view, the evaluation's main interest lies in the aspect of a transition from a situation of dependency to that of increased self-reliance.

The evaluation was mainly focused on the implementation phase of the study circle project, whereas the long-term effects were not possible to assess. The evaluation sheds light on methods for careful analysis of the goals, and the way in which this analysis can be utilized for the generation of conclusions concerning the result of a project. This is of particular relevancy for this study.

The evaluation did not arrive at only one set of conclusions, but instead, at two sets, depending on the perspective of judgement. Was it most important to achieve increased self-reliance and cultural regeneration? In that case, the project could justly be considered a success. But if it was considered more important to achieve a local mobilization, the conclusion would then be that the project had achieved only a limited impact (annex 5).

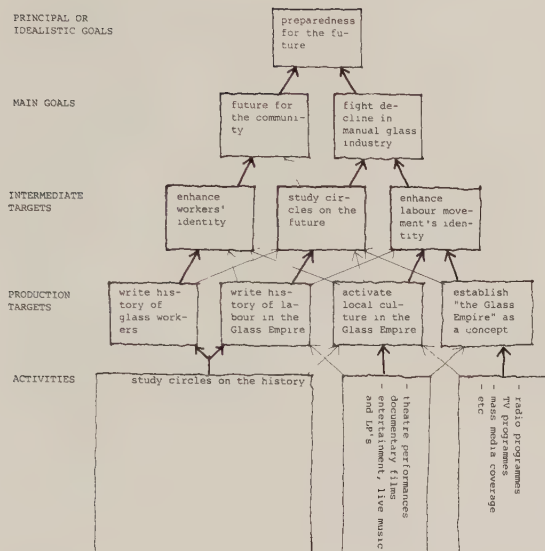
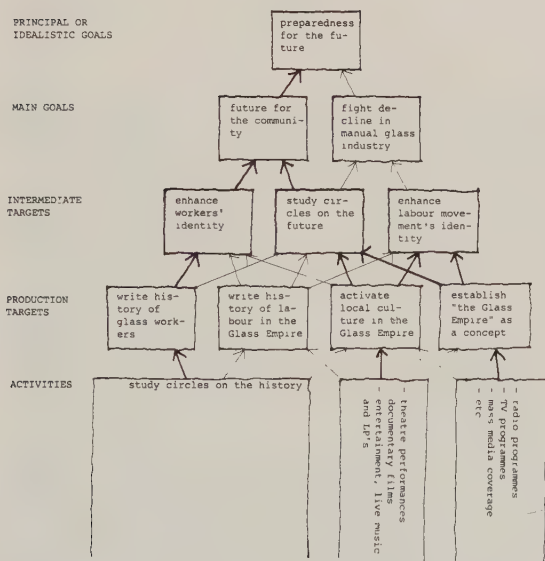


Figure 5:41 Anticipated result...



➔ Major relation
➔ Minor relation

Figure 5:42 ...and actual result.

Case Study Evaluations		"Regional Action Planning" (Johannisson 1982)	"Hospitals" (Reuterswård 1982)	"Village Water Supply" (Hahn 1981)	"Primary Schools" (Almeida 1983)	"Emergency Housing" (IRC 1976)
Indicators		SWE	VIE	IND	VIE	VIE
Country						
Commissioned by:						
- donor			x	x	x	x
- receiver		x				
Made by:						
- donor			x	x	x	x
- independant						
- receiver		x			(x)	
Research designs:						
- descriptive		x		x	x	x
- comparative		x	x		x	x
- analytical		x	x	(x)	x	x
- cost-benefit					x	
- aspect oriented					x	
- actor centered		x	x			
- random sample		x		x		
- hierarchical goal analysis		x	x	x		
Types of Analyses:						
- Effort		x	x	x	x	x
- Result		(x)	(x)			
- Causal		x	x	x		
- Process		x	x			
- Goal Achievement		x	x	x	x	
- Efficiency		x	x	x	x	x
Types of Errors:						
- theory		x	x	x	x	
- program		x	x	x	x	
Building Technology Dimensions:		n.a.		n.a.		
- Architecture			(x)		x	x
- Materials			x		x	x
- Process			x		x	x
Technology Transfer Analysis		n.a.				
Participation Analysis		x	x	x	x	x
Evaluated Phases:						
- investment		n.a.	x	x	x	x
- operation				x	x	x

Table 5:1 Selected indicators of the five case study evaluations
(n.a. = not applicable).

6 CONCLUSIONS

6.1 The State of the Art

Not too long ago the architect, the master builder and the user were all the same person. Some trades developed, such as that of the carpenter or of the mason, adding to the refinement of the building. This was the setting of the evolution of almost all vernacular buildings, typical for their aesthetic beauty and technical and functional congeniality.

Later, the architect was gradually separated from the builder, and the builder from the user. Regulations and standard lay-outs came to replace first-hand knowledge. Buildings and housing were produced for an increasingly anonymous market. In the process, the interest of the architect was gradually shifted towards the appearance and the decoration of the building.

An uprising among architects in the first half of the twentieth century sought to counteract this. Form was to follow function. The result is well-known: Stereotype housing and the international style. Research was employed to assert good adaptation to industrialized building methods and to an average user.

In the last decades, architects have become producers of drawings which should principally be water-tight from a juridical point of view. Builders have specialized in assembling buildings and building materials. Producers do not produce materials any more but products. The user became a consumer.



Figure 6:1 Vernacular architecture is closely adapted to local conditions, and is usually beautiful.

In the decision-making process, various forms of user participation have been attempted in order to arrive at a more individual adaptation. However, the actual ultimate user on the market has proved to be difficult to locate, and when located, his concepts of architecture tend to be too shallow and commercial to be taken seriously. Public participation in the building works has been more successful, contributing to cost reduction, if not to architectural quality. Self-help building is by some seen as a threat to the business, and participation can thereby be confined to increased access to the built environment.

This is the deplorable state of the art in which the need for more systematic evaluation has developed. Architects do not communicate with builders and might not ever visit the completed building. This is particularly the case with overseas projects and calls for evaluation of the investment phase ex-post. Few seem to communicate with the user in a way which would feed back information relevant to the decision making, the design or the building process. Hence, there is equally a need for evaluation of the operation phase.

6.2 The Issue

Evaluation is not thought to be a universal solution to the current problems of architecture. It might, however, serve to increase the decision-maker's and the designer's awareness of the capacities and the requirements of the individual site and user, as well as the options with regard to choice of materials and building processes. Systematic ex-post evaluation is a means, and the end is not spectacular architecture, but instead less costly, more useful and more congenial buildings.

The scope of evaluation is wide. In chapter 1, the delimitations of this study are given. These are particularly valid to the conclusions to be made in this chapter. The delimitations are, in summary:

1. evaluation is understood as ex-post evaluation
2. the subject is buildings in aid projects
3. the focus is on the investment phase
4. the study is synthesizing in relation to basic disciplines of architecture
5. the study applies theories and methods from other disciplines
6. the aim of the study is normative.

A study based on other delimitations would arrive at other conclusions. These would be complementary to those of this study, but not contradictory, as long as the inherent normative element is the same. Studies based on other normative values might very well arrive at contradictory results.

Furthermore a set of statements are made in chapter 1. In the subsequent chapters, these statements are discussed and their validity is supported. The statements are:

- increased efficiency is essential in the use of available resources for construction in developing countries.

The vast demand for buildings and the scarcity of resources is discussed in chapter 2. In a preliminary edition of SIDA's new manual for support preparation, implementation and evaluation, it is categorically stated that in reference to the choice of technology for building, "most efficient are the building methods that give the lowest cost of investment and maintenance throughout the entire lifetime of the building" (SIDA 1983:50). This statement is true, but too limited. A major point of this study is that the usefulness of the lay-out and design of the building is an equally important aspect of efficiency.

- aid and technology transfer are legitimate means of enhancing and modernizing the construction sector in developing countries.

This statement is discussed in chapter 3. It has been argued that aid and technology transfer do more harm than good in developing countries. However, since modernization is a central issue for most developing countries, the issue of this study is "how" rather than "if".



Figur 6:2 Building technology is different from other kinds of technology (credit A. Teikmans).

- building technology is essentially different from other kinds of technology.

The problems and prospects of technology and technology transfer have been extensively discussed by scholars in relation to, e g, machine tools and electronics. Building technology has characteristic features identified in chapter 3 which should be taken into account if efficiency and usefulness is to be enhanced.

- literature on evaluation theory does not take the characteristics of building into account.

In chapter 4, current theories on evaluation are reviewed. They are found to neglect the characteristics of building, and when buildings are touched upon, the literature is concerned either with cost aspects or with the activities carried out during the operation phase. This study, however, seeks to contribute to the understanding of evaluating the investment phase and the usefulness of buildings.

- there is no set of methods, be it qualitative or quantitative, which is universally applicable in this context.

Some authors tend to focus on evaluation of quantitative parameters with quantitative methods, whereas others stress the importance of qualitative methods. However, in chapter 4, it is found that there is strong support for the concept that methods will have to be selected individually for each evaluation, and that the criteria for this selection should be to enhance comprehensiveness and objectivity of the findings.

- handbooks on evaluation do not take the characteristics of building into consideration.

In chapter 4, it is further shown that several handbooks are concerned with evaluation of programmes having a building component. Building activities and buildings are thereof referred to as activities and production targets. This study demonstrates that if more useful and technically viable options are to be identified, the investment phase in itself should thereby be the subject of evaluation.

- evaluation case-studies frequently lack explanatory power with regard to the building component.

Taking into account the shortfalls of evaluation theories and handbooks, it is not surprising that evaluation case-studies of aid projects having a building component generally lack explanatory power and fail to generate more viable alternatives. Various research designs are employed, but the relevancy and the usefulness of the findings for the designing architect and for future projects are usually limited.

In section 4.1 of this study, three basic requirements for evaluation of a building are identified. An evaluation should:

1. take separately into account the experience from the investment phase and the operation phase.

This distinction is of particular importance to this study. The reason for this is that an evaluation has to be differently designed, depending on the phase to be evaluated. The focus of this study is, for several reasons, on the evaluation of the investment phase. A large share of the resources for aid projects is committed and used during the investment phase. By evaluating this phase, more efficient and useful alternatives can be identified, to the benefit of future projects. Furthermore, evaluation of the investment phase of building projects is a neglected subject, both in literature on evaluation theory as well as in evaluation manuals.

An evaluation of the investment phase of a programme having a building component is in no way contradictory to a later evaluation of the operation phase. A carefully designed evaluation of the investment phase is, however, a prerequisite if a later evaluation of the operation phase is to generate conclusions viable and relevant to the design and appraisal of future building projects.

The time period to be covered by an evaluation of the investment phase is well-defined. An ex-post evaluation should be made in conjunction with the inauguration of the building. If this phase is not evaluated, the gained experiences tend to be lost. This is particularly so in developing countries, where expatriate experts and consultants leave the country and where the local capacity to absorb experiences is weak.

2. separately shed light on the three determining dimensions of building technology; architecture, material and process.

The efficiency of use of resources and the usefulness of a building is closely related to the choice of building technology. The technology can usefully be divided into three determining dimensions. These are comparatively independent. The efficient use of (aid) resources usually implies an optimal mobilization of local resources. The three dimensions are, for this reason, subdivided into a scale with local or indigenous on the one extreme and imported or external on the other. This is illustrated by a model.

It should be stressed that optimal mobilization of local resources does not imply that only local resources should be utilized. The very justification of an aid project is the fact that local resources are insuffi-

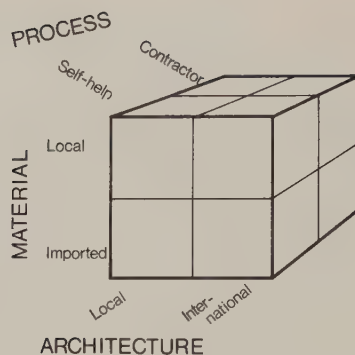


Figure 6:3 Dimensions of building technology.

cient or inadequate. In a specific building project, there might be good reasons for improving the local design, contributing with imported materials or utilizing contractors. These reasons can mainly be derived from stable, external factors. The aim of this model is to highlight the point that the composition of building technology is frequently decided in the absence of a thorough analysis of such factors. The selected technology is therefore in contradiction to such stable factors. It is possibly even more common that the importance of a stable factor is misjudged, leading to excessive quality and cost of the building. With additional efforts, the factor might be possible to manipulate. Environmental factors, which have been or could have been manipulated, are entitled variable factors.

The recognition of variable factors is closely linked to the process concept of building, as opposed to the product concept. In evaluation theory, variable factors are replaced by varying factors, which implies that the factor changes due to external reasons during the period of time studied in the evaluation. In the case of an evaluation of the investment phase of a building project, the time dimension usually limits allowance for major changes in external factors, unless manipulated through project efforts.

3. objectively seek to verify/falsify relations, and to distinguish between theory and programme faults.

The demand for objectivity is inherent to the use of scientific methods. Evaluations of building projects should employ such methods to the furthest extent possible. Objectivity is, however, not equivalent to impartiality. There is a normative element in evaluation which is justifiable if the evaluation partially favours the ultimate receiver of aid as well as good building practice and architecture.



Figure 6:4 Skills of local labourers are important for the choice of building technology. Red Cross emergency housing prototypes in Haiphong, Vietnam.

Objectivity is quite possible to achieve when quantitative methods are employed with quantitative and qualitative objective data, and when qualitative methods are used with quantitative data. Problems of objectivity arise when qualitative, subjective data is used particularly if qualitative methods are employed. A fairly high degree of objectivity can be achieved if qualitative, subjective data is screened against the different levels of goals of a programme. This has been demonstrated in two of the case studies referred to in chapter 5 on hospitals and the Glass Empire (Reuterswärd 1982 & Johannisson 1982).

It is most difficult to objectively judge the degree of architectural quality of a building. Nevertheless, this judgement is possibly the most common and also the most important to many architects. Architectural quality is sometimes understood as the degree to which a building affiliates to a favoured style, and how the architect has mastered the symbols of that style. This is a product-oriented attitude.

Instead, architectural quality should be judged according to the degree to which the building is congenial with the aims of a programme, the process through which it has come into being and local factors such as climate, needs of user, etc. Often, vernacular buildings are beautiful, due precisely to a high degree of congeniality. This has been achieved by a continuous feedback of experiences over a longer period of time within a basically static society, leading to a successive refinement of the building. Ex-post evaluations might

compensate for the lack of such a natural feed-back of experiences.

The distinction between theory and programme errors is a useful analytical tool. It focuses the attention of the evaluator on whether a lack in goal achievement could have been compensated for by better monitored efforts and as is usual, more resources, or whether the goals and the programme as such are wrongfully conceived. In-house evaluators tend to favour programme errors as an explanation for shortcomings. Identification of theory errors requires a higher degree of integrity of the evaluator. This was illustrated in chapter 5, where an evaluation of a water programme (Hahn 1981) identified theory errors. This was not favourably accepted by the aid organization, which commissioned a second evaluation to a more loyal evaluator, who obediently redefined the theory errors as being programme errors.

In chapter 3, a model for the analysis of technology transfer was proposed. The model is based on the recognition of two different dimensions of transfer; the vertical, from theory to practice or vice versa within a society, and the horizontal which is usually referred to in the case of technology transfer within aid projects. The model seeks to illustrate that a transfer of knowledge or equipment is not to be considered unless the technology is also integrated into the receiving society and possibly adapted to local conditions. This successive integration and adaptation can be illustrated by adding more steps of transfer. This is to say, that the success of transferred technology cannot be conclusively evaluated by studying the investment phase of a building project, since it might take quite some time before the eventual usefulness of a technology to the receiving society is obvious. On the other hand, it is sometimes quite possible to discern that a selected technology is a failure, and that no further efforts can alter this fact.

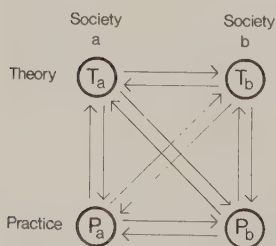


Figure 6:5 Dimensions of technology transfer.

The issue is whether an initial failure is due to stable factors or variable factors in the hosting society. Technology contradictory to stable factors is likely to be deemed to failure, whereas technology contradictory to variable factors might become useful, provided that these factors are manipulated. Two examples from chapter 3 and 5 illustrate this. The concrete block-making machine referred to (Almeida 1983) would never be of use since locally burnt bricks were superior for building walls (stable factor). The transferred machine for production of lime columns was, by many, considered a failure, but scientific cooperation has developed an understanding in Vietnam of the prospects and limits of the method, leading to the development of a modified method for the production of lime columns (development of local knowledge proved to be a variable factor).

The model for technology transfer covers both the investment and the operation phases of a building project. Although it might not be possible to evaluate the conclusive success of a technology at the end of the investment phase, efforts should be made to evaluate the outcome at that date, and to appraise the future development and the need for additional efforts. This assessment can then be evaluated in a later study of the operation phase.

In chapter 3, a model for the analysis of user participation was identified. One of the dimensions of the model is concerned with the evaluated phase; investment, operation or demolition phase. In the context of this study, the participation during the investment phase is of particular interest. This is to say, that the model is virtually two-dimensional within this phase. The two dimensions are the participatory level (physical planning, building or component) and the participatory role of the user-to-be (decision or production mainly since the consumer role is less applicable to the investment phase).

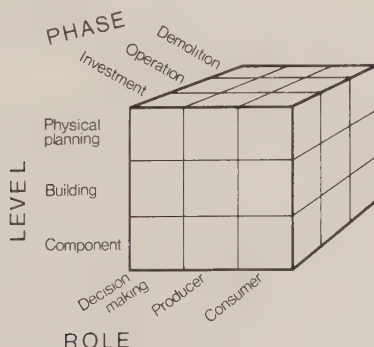


Figure 6:6 Model for analysis of participation.

The main aim of the model is to illustrate more clearly the connotation of participation in a given case. The model is static in the sense that it does not include a time dimension within each phase. The model is, however, capable of graphically illustrating how the participatory role of the user might change from one phase to another. The importance given participation is explained by the main motives behind it. Participation in decision-making is mainly applied to enhance acceptability of proposals and designs, and participation in production is applied to reduce (visible) costs.

In chapter 4, the analytical model for evaluation proposed by Nilstun was discussed, and in chapter 5 it was tentatively applied to the evaluation case studies along with the evaluative questions. These questions have been consciously applied in two of the case-studies (Reuterswård 1982 and Johannisson 1982). To become more operational, the model requires further development.

A first step in this development of the model including the characteristics of building projects, and particularly of the investment phase, can be made by combining it with the model for choice of building technology:

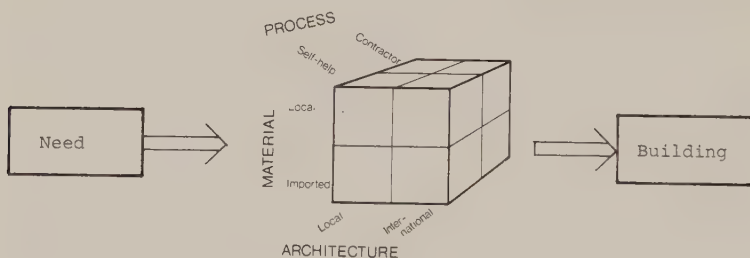


Figure 6:7 First step of the integration of the model for choice of building technology with the analytical model for evaluation.

An activity - education, health service - or individuals require buildings. A need can be established. Following this, the functional demands to be met by the building can be defined, as well as the general design of the building. The type and quantity of building materials can be determined and made available, and the construction work can be undertaken. Subsequently, we have a building ready for use.

Thus, the design of a building offers possibilities to choose between alternatives. However, this choice is not without restrictions. It is strongly influenced by a number of environmental factors. These can schematically be divided into stable and variable factors:

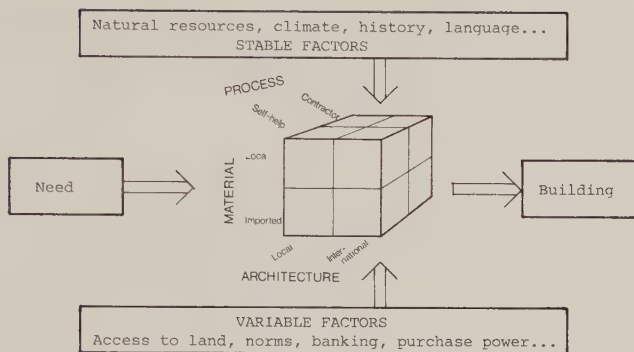


Figure 6:8 Second step, where stable and variable factors are added.

Stable factors are those determined by nature or those which cannot reasonably be influenced by a given site e.g the climate or access to sand, stone, etc. Furthermore, deeply-rooted traditions of the local population can be regarded as stable factors. These are stable within the time horizon taken into account in this context.

Variable factors are those determined by the individuals and the societal environment. These factors may vary or may be manipulated at a given site within a shorter period of time.

One example of such a factor is the economic strength of the actual society and the individuals concerned. The possibility to obtain credits for construction is closely related to this aspect. In many societies, credit regulations influence the design as well as the construction process of the building.

Another example of environmental factors is comprised of the norms and regulations valid for construction activities in a country. In many developing countries, these norms are a heritage from a colonial past. More often than not, these norms are poorly compatible with the local climate or the habits and needs of large parts of the population. This is even more so when expatriate experts bring norms with them from their own country of origin.

Questions related to the control over and access to land is yet another variable factor of great importance. If the individual does not possess the land title, the possibility to loan will be reduced, as well as the willingness of the family to invest their own time and money.

In 1976, the United Nations held a conference on Human Settlements. In the recommendations for national ac-

tions accepted at the conference, the importance of developing and pursuing an active housing policy for the benefit of the weaker sections in the society was particularly emphasized. Such a policy implies that a whole series of variable environmental factors should be deliberately modified.

When it comes to explaining the failure of a programme, vested interests among actors, such as corruption, are often referred to. Vested interests is a typical example of external factors having a strong influence on a project. The important issue is to analyze whether this factor is to be considered as being stable, thus forcing the project to adapt to it, or whether the project could have been designed in such a way that the factor is either avoided or deliberately manipulated, in line with the interest of the end receiver of the aid.

It is in this context that evaluation of housing and construction activities can play a central role. It should be the objective of evaluation research to attempt to explain how the construction and the use of buildings are influenced by the stable factors of the local society and the international agencies involved. Furthermore, the construction and the use of buildings should equally be related to the corresponding variable factors and thereby provide a basis for altering these or the initial definition of needs:

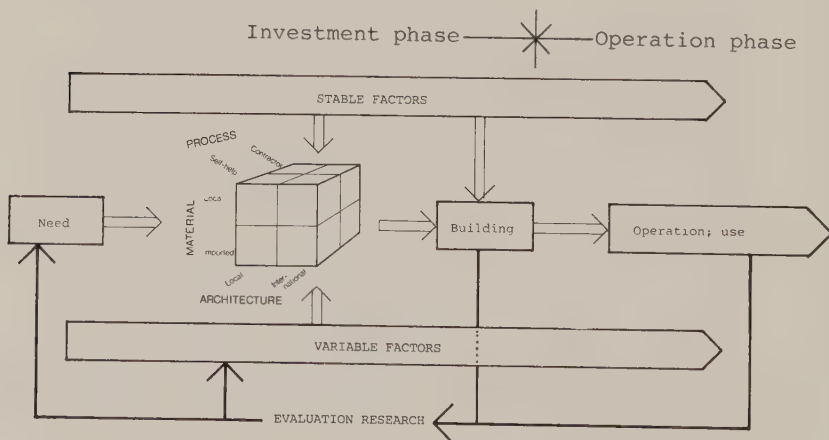


Figure 6:9 Conceptual model for evaluation of buildings in aid projects.

This model illustrates the fundamental difference between evaluation concerned with the investment phase and the operation phase of a building programme. It will enhance a more thorough analysis of the causes of systematic deviations from the initial definition of needs and goals the programme is to meet. This will

generate incentives to change or manipulate variable environmental factors, and indicate options in the choice of building technology.

The analytical model is supplemented by a set of types of analyses:

Goal analysis is most important in the evaluation of aid programmes since such programmes, by definition, are carried out in order to contribute to solving identified problems. In official documents, the goals of the investment phase are commonly treated in a rudimentary manner. This is due to an improper consideration that buildings are a production target, which in turn is a means of achieving more elevated goals formulated for the operation phase of a development programme. An independent goal analysis should be made of the investment phase, preferably an hierarchical model. The links between the achievement of the goals of the investment phase and those of the operation phase should be indicated.

Effort analysis is frequently requested by the commissioner of the study, and can be a useful tool in explaining programme errors. Analyzing the efforts can, however, mean that data is compiled beyond the limit of readability.

A comprehensive effort analysis is not always necessary in an evaluation. This is demonstrated by the evaluation of hospitals referred to in chapter 5 (Reuterswärd 1982). In this case, efforts made by individual actors were identified, but not the programme itself.

Result analysis is concerned with the wider impact of a programme and is not limited to the goals. To assess the results of a programme might require social, economic and other studies over a longer period of time, and might thus not be feasible in an evaluation of the investment phase of a building programme.

Causal analysis is to study the influence of stable and variable environmental factors on efforts, processes and results. To assess the relative importance of such factors is of the greatest importance, not only to explain the process of a programme, but particularly in order to generate alternative, more viable courses of action.

Process analysis is to assess the process through which the results were obtained. This analysis is closely connected to the causal analysis, and in practice, a distinction between the two analyses might not be required if only the investment phase of a building programme is to be evaluated.

Goal achievement analysis is to assess the degree to which the identified goals have been achieved. This analysis is vital to an evaluation of the investment

phase of a building programme.

Efficiency analysis is to analyze deficiencies in the working of a programme and to recommend improvements. This analysis is related to the causal analysis and to the normative aim of evaluating the investment phase of building programmes, which is to increase the efficiency in the use of resources and the usefulness of buildings. The efficiency analysis is thus the analysis which is likely to generate the findings most relevant to the decision-maker and particularly to the designing architect.

A distinction can be made between evaluation and evaluation research. An evaluation is primarily designed to compensate for a general lack of knowledge and particularly to counteract the seclusion of experiences gained during a programme. Evaluation research demands the use of scientific methods and is expected to generate findings of a higher degree of objectivity and validity. Evaluation research is to be preferred, but in case evaluation research is not feasible due to lack of funds, data and such, a carefully designed evaluation might be justifiable.

6.3 Further Research

This study aims at contributing to better and more relevant evaluation and evaluation research, primarily on the investment phase of building programmes in aid. The findings have been achieved by means of studying literature and by applying different approaches to evaluation case studies. These are mainly related to building programmes in Vietnam.

It would be of interest to test the validity of these findings in, i e, an African context. It would equally be of interest to have the findings applied in an evaluation by scholars from a receiving country.

Further research is required concerning the relation between methods for ex-ante appraisal of building projects and ex-post evaluation of the investment phase. Furthermore, the link between evaluation of the investment phase and the operation phase needs to be developed in future research and practical application.

6.4 Third Narrative: The House

In the middle of the seventies a young teacher from the School of Architecture in Dakar, Senegal, came for a visit to Lund. He was interested in studying Scandinavian Design, and we showed him instructive examples which the south of Sweden had to offer, both good and bad. He was serious and ambitious, asked a lot of questions and wanted to know more than we could find answers for. We described the image of a country where the housing problem was not any longer a question of

more square meters nor sewerage, but where the social problems were serious. We stressed the most current tasks of the architect as being segregation between different districts and the people's difficulty to identify themselves with the large-scale environments. He listened politely, but we thought that we understood that he had more immediate problems to work with. We envied him in a way. He laughed when he was shown a public dog toilet...

A few years later we visited Dakar. We were just passing through and it was our intention to visit the Agriculture School in Nianing, south of Dakar. The school is an excellent example of an old building technology, re-discovered by architects and engineers from UNESCO in Dakar. The technique is based on the requirement that the whole construction should be compressed, for the reason that reinforcement bars can be eliminated and hereby, the dependence on import can be decreased. The school was built in this way by students-to-be as an organized self-help construction, using stabilized mud blocks and low vaults. The idea has been carried to extremes, and the buildings are very beautiful, similar to Romanesque cathedrals. The buildings are also inexpensive and easy to maintain, with an excellent interior climate. The project has received Agha Khan's architectural prize (Habitat News, 1980:30).

Support from UNESCO has now ceased, and the project did not receive any further domestic encouragement for two reasons: The local building contractors opposed the project since it constituted a threat to their business. Self-help construction was considered unfair competition. Another more important hinder was that the National Architecture Association directly disliked the project. It was regarded as a symbol of the condescending attitude towards Senegal by foreign colleagues. It was not meant to build something "appropriate" or "intermediate" with "soft" technology here. Senegal was on the way to becoming a modern state, and it should be reflected in what was built!

Back in Dakar we caught sight of some sensational houses under construction: Two houses having an outer form of chopped-off pyramids. Large arches and cavities occupied the surfaces of the pyramids, and inside this shell the actual house could be seen with vertical walls. The pyramid was a parasol! The colouring was bold, in red and ochre with diverse decorative elements. The names of the contractor and the consultants were printed on a sign. The architect was the same person who had shyly laughed at our public dog toilet. He was now ranked highly in the city and had one of the leading roles in attempting to develop a new West-African architecture. This architecture was to be free from the European prototypes, without being traditional. The style was called "la parallélisme asymétrique". The chopped-off pyramids were fully adequate expression for this new architecture.



Figure 6:10 Nianing Agriculture School (Senegal).



Figure 6:11 "La parallélisme assymétrique" (Dakar, Senegal).

This third narrative aims at showing that there exists certain situations where humility of other persons having their own values and priorities, must be balanced with one's own professional conviction. Such might be the case, for example, when international aid carries out building activity which otherwise would not have been realized.

SUMMARY

Chapter 1

Chapter one sets out by identifying the delimitations of the study:

1. evaluation is understood as ex-post evaluation
2. the subject is evaluation of buildings in aid projects
3. the focus is on the investment phase
4. the study is synthesizing in relation to basic disciplines of architecture
5. the study applies theories and methods from other disciplines
6. the aim of the study is normative.

There is no specific target group for the study. It seeks to verify, a o, a set of statements maintaining that increased efficiency is essential to building in developing countries, that building technology has specific characteristics which theory literature and handbooks on evaluation do not take into account, and that evaluation case-studies accordingly lack explanatory power.

The study further seeks to establish the validity of three requirements for building evaluations, of models for the analysis of technology transfer, choice of technology, participation, and of an analytical model for evaluation.

The introduction continues by giving an outline of the contents of the following chapters, and is concluded by two narratives. The first one seeks to illustrate the character of a common strategy for technology transfer which should not be applied in the case of buildings; the second that normative judgement can never be avoided.

Chapter 2

In the second chapter it is shown that the potential need for construction activity in the developing countries is very great, this especially regarding the most poor countries. The actual construction activity in these countries absorbs, without exception, approximately one-half of the available investment. The greater part of these resources, however, is used for lesser portion of the total volume of construction. An increase in the financial resources for construction activity appears unrealistic unless the country's general economy is improved. An increased extent of construction thus principally implies a more efficient use of available resources.



Figure 1 School in Nianing, Senegal.

This statement is equally valid concerning the resources provided to developing countries through international aid. About forty percent of aid goes to construction activities, and it seems unlikely that this portion will increase. It is even more unlikely that the total amount of aid resources will undergo any dramatic increase within the foreseeable future.

Furthermore, it is possible to state that consultant activity and construction activity from industrialized countries in the developing countries has increased sharply during the 70's. A smaller portion of this activity has been generated directly through aid activity, but a large portion of the aid resources go de facto to Building and Public Works projects. Special consultant studies are quite often carried out by companies from the country granting aid, and often imply a "market introduction" for the company in question. This company can take advantage of its newly-won "competence in developing countries" in its marketing, in such a manner compensating for the stagnating construction market in the industrialized countries. In addition to this, the consultants function as "spear-heads" for their own country's industry. In regards to transfer of technology from industrialized countries to the most poor developing countries, the consultant studies financed through aid thus indirectly have a double multiplier effect.

The aid authorities cannot avoid taking the responsibility in this context. The next chapter deals with the character of this responsibility.

Chapter 3

The third chapter tries to analyze the nature of technology transfer within the building sector and to indicate models helpful in this analysis. To this end, current trends in development theory are reviewed. Development theories could be said to have two aspects. Firstly, they could be geared to explaining and foreseeing development. Secondly, this aspect being more relevant in this context, they could be normative. The theories were found to support the notion of modernization, a central theme in this discussion since it legitimizes development cooperation and technology transfer within the building sector.

It is stated that most of the developing countries desire a modernization of their construction industry and that transfer of technology from the industrial countries is, therewith, considered to be of benefit. This can be called horizontal transfer. In order for an industrial technique to be transferred to a developing country and be integrated there, it appears that there is a demand for, on the one hand, a period of accumulation of capital, and on the other hand, changes of institutions, education levels and other factors in the society. This implies a change in the developing country and can be seen as a condition for the materialization of the vertical dimension of the transfer.

Three main strategies, and a model, are identified:

1. development of indigenous technology ($T_a \rightarrow P_a \rightarrow T'a$)
2. transfer of well-known technology ($P_a \rightarrow P_b \rightarrow T_b$) and
3. transfer of peak technology ($T_a \rightarrow P_b \rightarrow T_b$).

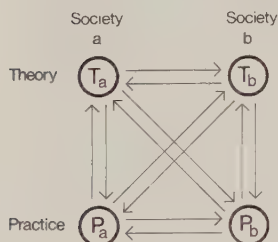


Figure 2 Dimensions of technology transfer.

Two examples of technology transfer are analyzed. The first example concerns geo-technology and the transfer follows this pattern: ($T_a \rightarrow T_b \rightarrow P_b$). The transfer promises to be successful, mainly because research cooperation was added to the mere transfer of a machine. Indeed, the machine might now be discarded since the benefit of the project lies in the adaption of the science and the method to Vietnamese conditions and locally existing equipment. The final outcome of the project would thus be: ($T_a \rightarrow T_b \rightarrow P_b$).

The second example concerns the transfer of factories for large concrete panels, following this pattern; (Pa→Pb→Tb). The second step of the transfer was never achieved since there were too many societal factors which were unfavourable for the assimilation of the technique into the Vietnamese society.

In order that a choice of strategy can be well-motivated, a precision of possibilities and limitations within the construction sector's different subsectors is required. An attempt to identify distinctive features of building as an industrial activity are made:

1. A building is sold before it is produced.
2. A building is usually very permanent.
3. Even in the industrialized countries a building is a less-advanced product, from an industrial point of view.
4. A building is chiefly a shell around a desired activity.

It is suggested that the concept technology, when applied to an individual building, ought to be divided into three dimensions. They are:

1. Architecture; subdivided into local and international.
2. Materials; subdivided into local and imported.
3. Process; subdivided into self-help construction and construction by contractors.

A three-dimensional model for these three dimensions of building technology is given:

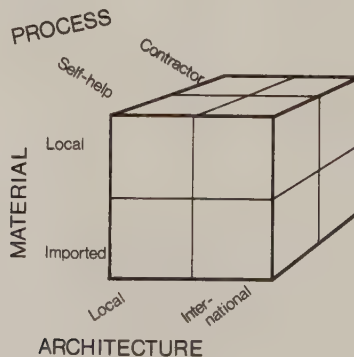


Figure 3 Dimensions of building technology.

It is stated that the architecture and the design, in general, only affect the desired activities to a limited extent as long as the design meets certain minimum performances. It can only enhance, or hamper the users, not really create or prevent them from carrying out, e g, education or health care. On the other hand, the physical aspect of a building must be said to be subjectively and emotionally important to the user.

The choice of materials affects the total cost of a building to a large extent, particularly with regard to simple, low-cost structures. If the workmanship is properly carried out, it is often impossible for the layman to know if the materials used were local or imported. During the investment phase, imported materials, are, however, often favoured. They are more easy to standardize and thereby to specify, and have psychological advantages.



Figure 4 Example of innovative combination of building technology dimensions (Nianing, Senegal).

The process by which a building is produced is not equally easy to distinguish once the building is finished. The choice between self-help or construction by a contractor is frequently affected by vested interests

It is further noted that most construction in developing countries can either be categorized as local design, built with local materials and through self-help, or as international design, with imported materials by contractors. More innovative combinations should be

sought for. The most commonly found combinations of building technology variables can be illustrated by means of the given model:

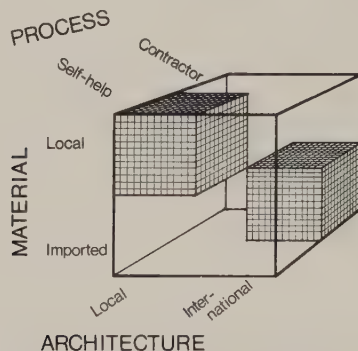


Figure 5 The two most frequent combinations of building technology dimensions, corresponding to the formal sector and the informal sector.

Chapter 4

This chapter sets out to identify the requirements to be met in an evaluation strategy for buildings in aid. It should, principally:

- account for both the investment phase and the operation phase
- analyze three dimensions of building technology; architecture, materials and process, and
- enhance objectivity and distinguish between theory and programme errors.

To date, evaluation research has mainly been developed in relation to disciplines such as economy, education, medicin and social action projects. There is little literature on evaluation of building programmes or of the building component within broader development programmes.

Within the evaluation research movement many researchers have stressed the importance of the use of quantitative methods. Evaluation of social action programmes have mainly been regarded in this context. A closer analysis indicates, however, that the meaningful distinction rather implies the managing of subjective and objective information respectively. Consequently, it is the manner of managing and analyzing the information which is decisive for the degree of reliability.

and objectivity of the result of the evaluation. Applicable analysis models have, regarding this, been formulated, among them, especially those focusing on programme evaluation. It is hereby stressed that the ultimate aim of evaluation is control.

A higher degree of consciousness of the building component's importance is found in appraisal literature. This indicates a weakness in the connection between ex-post evaluations and the way in which new projects are formulated and appraised ex-ante; asymmetry exists.

One author suggests a promising analytical model for the concept evaluation:

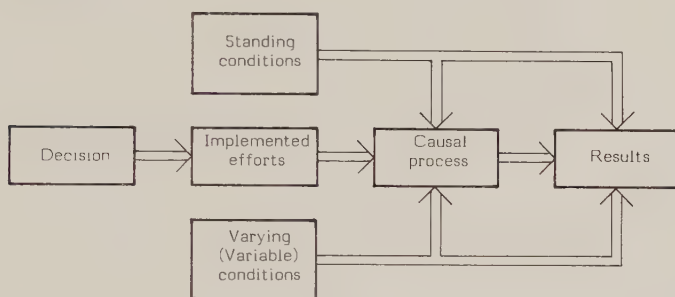


Figure 6 Analytical model for evaluation.

This model is not developed for evaluating buildings, but nevertheless it is clearly applicable to the investment and the operation phases alike. In relation to the model, six evaluation questions and corresponding types of analyses are given:

<u>Evaluation questions</u>	<u>Type of Analysis</u>
What efforts were made in order to realize the goals?	Effort Analysis
What were the results of these efforts?	Result Analysis
What conditions cooperated with the efforts concerning these results?	Causal Analysis
In what way were the efforts related to the results?	Process Analysis
How were the results related to the goals?	Goal Achievement Analysis
Were the efforts an efficient way of achieving the results?	Efficiency Analysis

With reserved modifications, e g, the exchange of the concept-varying factors for variable factors, the model is found to be useful. The model for analysis of transfer of building technology can be utilized in several of the types of analysis for choice of building technology and participation.

A central issue of programme evaluation is the analysis and definition of goals. In social action programmes in particular, goals can be difficult to establish in a rational manner. However, concerning building programmes in aid, the formal goals are generally more specific. The evaluator should thus be careful to clarify and organize these goals in an operational way, and to make use of them in the evaluation.

Evaluation handbooks provided by international aid agencies give useful general advice on how to design and carry out evaluations. In several cases, the use of goal hierarchies is advocated. It is stressed that evaluations are to be useful for the management and the programme officers of the agency, but the handbooks are comparatively vague on methodological issues.

An evaluation of actual time consumption compared to time plan, and actual costs compared to budget it was referred to in those cases where the building component is mentioned. Such evaluations give little information on alternative methods of management, and the possibility to generalize is therefore low. One handbook states that the construction component ought to be the object for evaluation, but direct recommendations are lacking.

In reviewing a number of case studies regarding accomplished evaluations of projects with larger building components, it can be stated that they do not comply with the desires formulated regarding an evaluation. The economic aspect is often dealt with in relation to costs. The building component has a reserved role in the cases in which a cost-benefit analysis had been carried out. Most of the studies recommend the use of local materials, but this is seldom supported by systematical analyses of alternatives. The design of the buildings is dealt with very casually and ad hoc. A large part of the studies gives a lot of consideration to the process through which the buildings have come into existence. A chronological account is often given and management and banking questions are stressed.

Several studies describe the investment phase, but the successive determination of the building is seldom touched upon. The operation phase is dealt with in some of the studies, but the possibility to generalize in these studies is low, and a clear division between the investment phase and the operation phase is seldom made. Errors (that is, not optional decisions), when registered, are regarded as programme defects. The feedback to goal and underlying theory seldom takes

place. Only a few of the accomplished studies can be said to meet basic scientific demands.

Chapter 5

In the fifth chapter, five evaluations are reviewed. I have contributed to all of them. They concern widely varied projects as well as several countries. Nevertheless, they can be said to represent a search for more developed and valid evaluation strategies.

It seems that if the evaluators belong to, e.g., the funding agency, it is unlikely that they will identify theory errors. On the other hand, evaluators with this background provide in-depth knowledge about the programme and the goals of the organization. They also increase the credibility of the findings of the evaluation. Thus, a combination of such evaluators and evaluators from independent institutions is often to be favoured. To evaluate construction projects, it seems valuable that at least one of the evaluators has thorough understanding of the technology of building.

The methods used in the evaluations vary considerably. A descriptive analysis does not in itself seem to secure a high level of validity of the conclusions. This can be achieved if the analysis is more clearly related to certain aspects, which also indicates that a different set of conclusions could be arrived at if the evaluation focused on other aspects. A comparative analysis is a powerful tool, but not always applicable; it is most feasible when the programme involves several buildings of a rather similar type.

The cost is found to be a strong evaluative criterion, especially when there is a scope for a comparative analysis between similar buildings within a programme. It is, however, quite possible to make a relevant evaluation without a thorough cost analysis. This applies particularly when alternative costs are difficult to establish and when the over-all economic impacts of a project and its potential alternatives are vague.

The use of random samples is one of the most common methods to reduce the bias of the evaluator and thus increase the validity of the evaluation. Random samples are, however, not always feasible.

One way of compensating for the lack of a random sample is to center the evaluation around the actors. Thereby, it is possible to profit from the vast experience among those actively involved in the project. It equally seems to increase the possibility that the findings of the evaluation can be accepted by those concerned, even if the findings are not favourable.

A most important tool for an evaluation study is a thorough and independent goal analysis. If this is done

correctly, most findings can be screened against such a set of goals. Thereby, it can be accepted that a result can be both positive and negative. For example, the successful achievement of a low-level goal can actually be detrimental to a higher goal level. The use of goal-hierarchies is recommended.

The methods neither seem to be affected by the country in which the evaluated project is carried out, nor by the character of the donor agency.

The six identified types of analysis with corresponding evaluation questions were found to provide a powerful analytical model for evaluation of buildings. With reserved modifications, the model is applicable to both the investment phase and the operation phase. When a funding agency has commissioned an evaluation, the focus tends to be on Effort, Goal Achievement and Efficiency analyses.

Theory and programme errors can be analyzed within a given evaluation. Theory errors are frequently associated with higher goal-levels, but this is not always the case. To arrive at valid conclusions at lower goal-levels, the alternatives have to be assessed. This can be done by a thorough analysis of, e.g., the technology involved. The suggested three-dimensional model could provide useful support in this endeavour.

The three-dimensional model for choice of technology has been applied to the case-studies involving a building component. The selected dimensions seem to cover the most pertinent aspects of building technology. The model seeks to focus the analysis on alternatives for the two most common combinations of variables represented by the formal and informal building sectors. To this end, the model is found to be useful.

To evaluate the architecture of a building during the investment phase implies something entirely different from evaluation during the operation phase. During the investment phase, the architecture can only be evaluated with regards to the design of the building, whereas its performance in relation to the users can only be assessed during the operation phase.

The choice of materials can be evaluated with regards to production and available alternatives during the investment phase. The long-term durability and thus, the maintenance and life-cycle cost, is to be evaluated during the operation phase, particularly for more complex or "modern" buildings.

The model for analysis of technology transfer represents a useful tool for graphical illustration of the transfer strategy under study. The model enhances the understanding of building technology, not as equipment or technique, but as part of a process. To achieve a



Figure 7 "Appropriate" equipment is not always useful.

successful transfer, the technology must not only be adapted to local conditions but also integrated into the society. This can be supported by training and research, and evaluated by means of Causal, Process and Result Analyses.

Chapter 6

In the sixth chapter, the conclusions of the study are listed. The following statements, made in the introduction, are found to be valid:

- increased efficiency is essential in the use of available resources for construction in developing countries

- aid and technology transfer are legitimate means of enhancing and modernizing the construction sector in developing countries
- building technology is essentially different from other kinds of technology
- theory literature on evaluation does not take the characteristics of building into consideration
- there is no set of methods, neither qualitative nor quantitative, which is universally applicable in this context
- handbooks on evaluation do not take the characteristics of building into consideration
- evaluation case studies frequently lack explanatory power with regard to the building component.

Three basic requirements for evaluation of a building were discussed in the study and found to be relevant. An evaluation should:

- take separately into account the experience from the investment phase and the operation phase
- separately shed light on the three determining dimensions of technology: Architecture, Material and Process

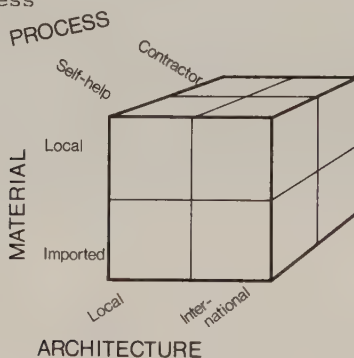


Figure 8 Dimensions of building technology.

- objectively seek to verify/falsify relations and distinguish between faults in theory and programme.

The model for technology transfer provides the evaluator with an analytical tool. This supports the understanding of technology transfer as a process in which the technique in itself only constitutes an initial step.

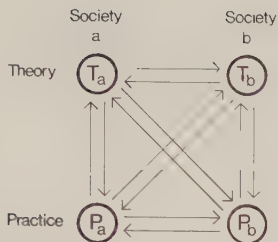


Figure 9 Dimensions of technology transfer.

It is of importance that the initial step is followed by an integration into the receiving country. This means that additional research, training or other efforts might be required.

The success of a transferred technology is dependent on the extent to which it does not contradict dominating stable societal factors, nor variable factors, unless these can be manipulated. The model is not restricted to the investment phase, but emphasizes the link to the operation phase.

The model for analysis of user participation is yet another tool for facilitating the understanding of the evaluated project. Its value lies in clarifying the character of participation with reference to the evaluated phase.

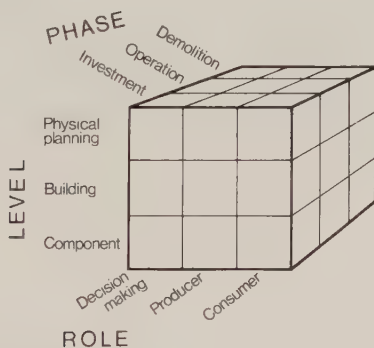


Figure 10 Model for analysis of participation.

The model has not been comprehensively tried in the study since only one of the evaluated case study projects included participation. However, it does promise to be useful.

The analytical model for evaluation research, proposed by Nilstun, is commended. To be more useful to the evaluation of the investment phase of building pro-

jects, certain modifications are found to be necessary. The model for analysis of choice of building technology is integrated:

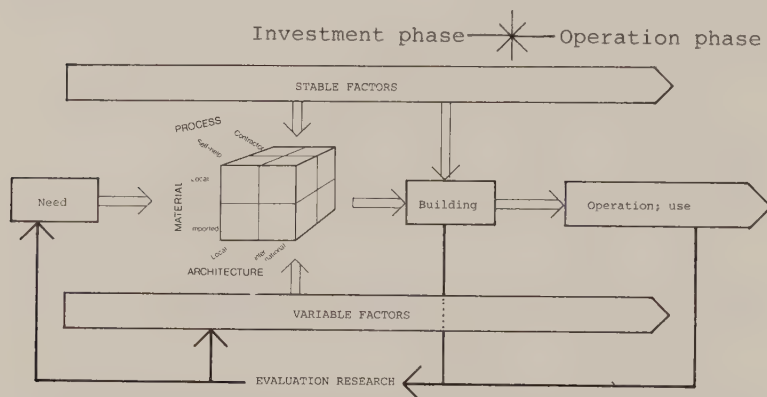


Figure 11 Analytical model for evaluation of building, e.g. the investment phase.

Evaluation of building projects should thus explain the influence of stable societal factors on process and outcome. Furthermore, the variable factors should be related to the project, thus providing a basis for altering these variables or the initial definition of needs.

The model is supplemented with a set of analyses:

- Goal Analysis is instrumental in any evaluation of building projects
- Effort Analysis is useful but not always essential
- Result Analysis might not be feasible in evaluating the investment phase of building projects
- Causal Analysis and Process Analysis are closely related and can, for practical reasons, frequently be combined
- Efficiency Analysis is related to Causal/Process Analyses, and is instrumental in generating alternative strategies, based on the normative aims of evaluation of building projects in aid.

Further research is required to test the validity of these findings in a more general context, and also for evaluators from receiving countries to test the validity of the findings. The relation between appraisal ex-ante and evaluation ex-post of the investment and operation phases should be further studied.

The conclusions are terminated by a third narrative illustrating that evaluations are based on normative values, and that these values should be stated, no matter who is responsible for the evaluation.



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INDEX

	Pages
FOREWORD	3
DIRECTOR'S REPORT	5
INTRODUCTION	5
A FUNDAMENTAL CRITERIA: URGENCY	6
TECHNICAL SPECIFICATIONS ON THE HOUSES NEEDED	6
IMPLEMENTATION	7
VIETNAMESE REMARKS ON THE SETTING UP OF THE HOUSES	8
IOG COMMENTS ON IMPLEMENTATION	9
CONTROL	9
CONCLUSIONS	11
COMPLEMENTARY REMARKS FROM THE VIETNAM SIDE	14
ILLUSTRATIONS	16
ANNEX A:	31
DETAILED DESCRIPTION OF THE VARIOUS STAGES OF THE PROGRAMME	
1. TECHNICAL PLANNING AND PROMOTION	33
1.1 Basic data required to implement the project	33
1.2 General urbanization principles	33
1.3 First expert estimates	34
1.4 Information synthesis	34
1.5 Information and publicity	35
2. APPEAL AND EVALUATION OF OFFERS RECEIVED	36
2.1 Principles and general considerations	36
2.2 Puutalo oy houses	38
2.3 Kinsho-Mataichi houses	40
2.4 Byggma Syd houses	42
2.5 Fritz Barth houses	44
2.6 Equipment	45
3. TRANSPORT	45
3.1 General considerations	45
3.2 Transport of various units	46
3.3 Transport of the infrastructure material	47
4. ASSEMBLING OF PREFABRICATED HOUSES IN VIETNAM	47
4.1 Reception of material	47
4.2 Material distribution	48
4.3 Construction	49
5. VIETNAMESE VIEWS ON THE VARIOUS HOUSE TYPES	51
5.1 The Puutalo Oy houses	51
5.2 The Kinsho-Mataichi house	52
5.3 The Byggma Syd house	53
5.4 The Fritz Barth house	55
5.5 Some general conclusions	55
ANNEX B: DESCRIPTION OF THE PROJECT (MEMORANDUM OF MAY 1973)	57
1. BASIC CONDITIONS	58
2. CLIMATE	59
3. THE DWELLINGS	60
4. BUILDING (GROUP OF DWELLINGS AND FACILITIES)	61
5. HOUSING ESTATES – BUILDING COMPLEXES	61
6. CONSTRUCTION	61
7. PLANS OF THE THREE TYPES OF BUILDINGS SUGGESTED	64
8. BIBLIOGRAPHY	67

Director's Report

INTRODUCTION

Within the perspective of an operation of humanitarian assistance in Indochina after the cease-fire in Vietnam, the International Committee of the Red Cross (ICRC) and the League of Red Cross Societies (League), created in the last few months of 1972, the Indochina Operational Group (IOG) and appointed me as Director and Co-ordinator of International Red Cross Assistance (IRCA). I was thus led to assume the responsibility of all operations undertaken in this field, reporting to the Coordinating Body ICRC/League for Indochina, called the "Ad Hoc Group".

In this context, discussions took place in Hanoi, in February 1973, between representatives of the Red Cross and authorities of the Democratic Republic of Vietnam (DRVN) and the coordinator of International Red Cross Assistance (IRCA), to examine various forms of assistance, and in particular the emergency housing programme which is the subject of this Report.

The Vietnamese wished to secure the co-operation of the International Red Cross to fulfill the need for dwellings in the cities, in which more than one million persons were without shelter as the result of the destructions caused by the war. Thus, building materials (steel, steel components, cement, sheet iron) headed the priority list established by the participants in conversations with the IOG.

The Indochina Operational Group was ready to answer favourably to these requests. However, it pointed out that Red Cross National Societies which would, in the first instance, collect the necessary funds for financing the programme would probably find it difficult to obtain public support, as building materials are not traditionally considered as emergency relief contributed by the Red Cross. The supply of tents and other types of shelters (including prefabricated houses) is a more traditional type of assistance, being better understood and thus inspiring more widespread support. It was difficult to define from the outset the whole programme, as its extent would depend on the success of the fund raising i.e. upon the reactions of eventual donors when they would see the project.

The setting up of tents was never envisaged as an appropriate solution, as this kind of shelter is not adapted to climatic and social conditions in Vietnam.

The cost of the programme was set at the tentative figure of 20 million Swiss francs. This figure was to prove realistic later on. Taking into account the low cost of prefabricated buildings to be considered, this amount would allow for the construction of 5 000 to 10 000 family dwellings, or with ten persons per dwelling unit, make it possible to house between 50 000 to 100 000 persons.

This last figure would correspond to a proportion of 5 to 10% of the most needy of the Vietnamese urban population. The Vietnamese considered that the number of people per room should be reduced as and when the general housing situation improved. Within a more or less distant perspective, the importation of prefabricated houses would therefore make it possible to satisfy the need for new dwellings in a proportion of 2 to 5%.

These proportions being taken into account, the Vietnamese considered as interesting the importation of prefabricated houses. The disadvantages of this solution, which did not correspond to any tradition in the country, would be compensated by a forthcoming increase of the assistance given and by the speed in which it would be provided. Moreover, the opportunity thus offered in gaining some experience in the use of prefabricated houses on a relatively extensive scale, could be useful in the future.

It is on the basis of all these considerations of which only a brief account is given in this Report, that the representatives of the RCDRVN, State experts as well as the director and experts of the IOG met in Hanoi in April 1973, to finalize a general plan and draw up the necessary technical specifications to invite tenders.

Towards the end of 1974, the essential part of the work to be done outside Vietnam had been carried out. About 4 000 prefabricated units had been delivered in Vietnam. This figure, which was about 20% below the least optimistic estimate, is explained by the considerable increase in costs which took place during the implementation period, and because part of the funds had been used to finance the purchase of pipings and building cranes.

A FUNDAMENTAL CRITERIA: URGENCY

Urgency was the dominating factor in the establishment of the programme and then in its implementations. Indeed, it was essential to give a shelter to the homeless as rapidly as possible. It was also important to approach potential donors at a time when they still were sensitive to the situation in Vietnam, hence the necessity to speed up preparatory work.

As soon as the decision was taken in principle, and even before the project had been drawn up in detail, an appeal was sent out to potential donors in order to raise their interest without delay. Technical specifications would come soon afterwards in order to stimulate contributions and avoid hasty donations of unsuitable houses.

Urgency also greatly influenced the submission of tenders. Thus certain manufacturers gave up the idea of making offers; moreover some interesting tenders arrived too late for them to be considered.

Had there been more time, it is certain that more appropriate solutions would have been found and it would have been easier to foresee and avoid some mistakes and problems connected with the transport of material and the construction of the houses.

TECHNICAL SPECIFICATIONS ON THE HOUSES NEEDED

The meeting which took place in Hanoi in April 1973 made it possible to establish precise although flexible specifications of the houses to be imported, owing to differing requirements, albeit not always compatible.

The optimal durability of the houses was set at about thirty years. This judgment was based on past experience in Hanoi, where it was found that temporary constructions tended to remain in use longer than foreseen, and on the general experience obtained with low price construction.

The second requirement stipulated that the houses were to be of low cost, so that the needs could be fulfilled to the greatest extent possible.

This desire to secure low cost housing corresponded also to criteria of social justice. It was indeed possible to foresee that housing conditions in the cities would remain difficult for several years. It would therefore be unsuitable to import houses which would give an advantage to those who were going to live in them over the rest of the population. (The experience gained until now shows that the general level of quality was probably judiciously selected, but further experience will be needed before final conclusions can be reached).

Controversy arose as to the methods to be followed in setting up the houses. By grouping houses of the same type in a few determined areas, even in a single perimeter, expenditure for transport, training of personnel, construction and maintenance – and probably also the costs of infrastructure could be reduced. But such a solution would have required considerable planning, much time and an important complementary infrastructure to avoid gaps as regards services and social conditions. Finally, it was decided to choose a moderate sized set-up, the advantage of which, it was thought, being that there would be less immediate need for roads, schools and other social, commercial and administrative structures for general purposes. This set-up would also facilitate improvisation or later modifications.

This solution also corresponded to the Vietnamese desire to do something for people in as many cities as possible. The Vietnamese also decided to gather different types of houses in the same location so as to show that several foreign countries helped Vietnam to heal the wounds caused by the war.

Furthermore, it was thought that possible disadvantages would be easier to correct or tolerate if these new constructions were distributed in relatively small groups.

The original idea of providing buildings with more than one storey in order to economize land was also relinquished due to various economic factors, technical reasons and the time available.

The technical specifications resulting from the above-mentioned considerations also had to take production conditions into account. They therefore constituted a synthesis of many factors, and to a certain extent a compromise, which is described in more detail in Annex B.

Let us say here that if one wished to mitigate the disadvantages resulting from the extreme simplicity dictated by economic considerations and the inconveniences which might result from unavoidable mistakes one should select constructions of a type adaptable in function, for instance, with the growth of families. Basic construction should also allow for further modifications and additions later on, for instance by improving thermic insulation and the installation of electric current.

The description of the construction desired established jointly by the Vietnamese and IOG experts was relatively detailed. Many items were however listed as optional in particular as regards the choice of materials. It was thought that constructors and manufacturers would usefully contribute to the programme if they were free to suggest some solutions on the basis of technical specifications of a general character.

IMPLEMENTATION

Annex B, giving technical specifications was submitted to the potential donors and to manufacturers in May 1973. Several offers were received (Annex A, No. 2) representing various types of houses, materials and general concepts. None corresponded sufficiently to the specifications given for passing orders and undertaking manufacture without effecting some modifications. As regards the specifications given, these offers could be considered as a first test of the readiness and capacity of the manufacturers to deal with definite requirements. A great many of the firms who had made offers could thus be rapidly excluded.

The first interesting bids came in July 1973, and the first orders were passed soon after in Finland. Other orders were subsequently made in Japan and in Sweden, to be paid from IOG general funds. Contributions in kind were also received from the FRG and later on from Sweden. Deliveries reached their highest point towards the middle of 1974 and ended some time in December.

It would have been desirable to have a precise time-table for the arrival of material in Haiphong to enable the Vietnamese authorities to coordinate their tasks with the general reconstruction and development activities. However this was not always possible, as IOG had to continue its fund raising activities during a relatively long period, alluding to the first purchases to stimulate further supplementary contributions.

Various controversial factors also influenced the rate of the placing of orders, such as the desire to acquire some experience, specially in order to modify purchasing criteria. The strong trend of rising prices for material and transports had also to be reckoned with; it was not long before this trend became a reality.

Moreover, purchasing operations were also influenced by the necessity of experimenting with several construction methods and types of materials so, that sufficient experience could be acquired in Vietnam, in selecting the lines to be followed in the future developments within the country.

All this required a great deal of flexibility on the Vietnamese side, which was responsible for the following:

- unloading goods in Haiphong harbour which was much overcrowded at that time;
- storage of the material;
- transportation to the building yards;
- preparation of the building sites, including common installations such as roads, sewers, water supply, electricity, as well as the building of kitchens and sanitary installations, such elements varying according to the different types of houses;
- training of the technicians who would be responsible for setting up the houses;
- preparing the setting up of social purpose buildings;
- preparation of the attribution of family dwellings.

It has already been said that the Vietnamese contributions to the joint undertaking was most varied,

even full of complexities from the planning and implementation point of view. This task was carried out in conditions demanding a definite experience and some special resources which were not always available. The Vietnamese views on this project are therefore highly interesting. We quote them verbatim hereinafter.

VIETNAMESE REMARKS ON THE SETTING UP OF THE HOUSES

Apart from the official IOG delegations coming to Vietnam for negotiations and signatures, IOG personnel entrusted with the organisation and coordination also came over to examine and familiarize themselves with the situation and give at every stage of the execution of the programme the necessary impulsion. Such missions were necessary and the Vietnamese participants cooperated with the IOG personnel.

But if longer term plans had been fixed, setting the date and duration of the visit of IOG personnel as well as their mission, the Vietnamese side would have been able to help them even more in carrying out their tasks.

Some technical construction problems were not entirely new for the Vietnamese side. Thus, was the assistance of experts in the setting up necessary in all cases? For some types of houses, if we had had at our disposal all the drawings giving full technical details with mounting instructions, and if thorough exchanges of views had taken place with organizers and coordinators (who were architects at the same time), the presence of experts would not have been absolutely necessary. This is what practice has demonstrated. Nevertheless, the presence in Vietnam of construction experts, with their consummate technical skill, was really efficacious in the assembly of prototype houses. In a situation in which the setting up of houses must be undertaken rapidly in order to put the dwellings at the disposal of numerous homeless persons, it is necessary to send assembly experts simultaneously with the prefabricated elements.

The Vietnamese side made both its experts and specialized workers work with the IOG experts so that they should learn how to put up the simple type houses delivered. This method later allowed the setting up of other houses on different sites without the assistance of experts. Training on the spot of workers is even more necessary for the setting up houses of complicated types.

It is considered judicious that a single body should be entrusted with the reception of materials; this has the following advantages:

- the harbour is cleared rapidly, as prefabricated houses are cumbersome because of their considerable bulk and size. (It would not be possible to free the harbour space in such a short time if all the groups concerned came separately to take possession of their houses);
- moreover, the means at the disposal of these groups being different, collecting and transport would involve numerous difficulties (entrusting a single body with the whole task makes it possible to avoid these difficulties, to unify transportation and reduce the time the supplies have to stay in the harbour);
- upkeep of supplies and the quantitative and qualitative control of the deliveries are also made easier.

The IOG prefabricated houses are placed in Vietnam under two methods: dissemination and concentration, the first being the most frequently applied. Because it makes it possible to avoid some of the work inherent with any important and concentrated building yard, dissemination allows for quicker availability of the dwellings.

For these imperative reasons, most IOG prefabricated houses have been distributed in several residential zones: the FRG houses being placed near the collective dwellings of Kim Liên (Hanoi) and in the popular residential estate of O Chó Dừa; the Finnish houses were placed at Phu Nghia (Nam Dinh), the Japanese ones at Yên Lãng (Hanoi) and Coc 3 (Hon Gai), the Swedish ones at Giang Vo and Ton Dan (Hanoi), etc.

But dissemination has also its drawbacks which the trial setting up carried out under the directions of experts cannot prevent: packages must be divided up and there is a risk that their contents may be lost or mixed up with parts belonging to other houses; the maintenance of the houses after mounting is more difficult when the houses are dispersed.

Special building conditions in Vietnam where building sites are limited do not allow for many concentrations of prefabricated houses. At the present moment, there are only two such concentrations one at Cat Bi, near Haiphong and the other at Dong Anh (this refers to the beginning of the setting up of the houses in 1975).

The IOG prefabricated houses for the victims of the war constitute the first important form of assistance in this field, and useful conclusions may be drawn for the use of such houses in countries suffering from the effects of war or natural disaster. This assistance is all the more valuable as it corresponds to a necessity in the daily life of a population which has suffered long years of war. It also comes within the framework of emergency assistance and can contribute to relieve to some extent the immediate need for dwellings for part of the population. This assistance will also contribute to help in facing normal housing needs, as these houses can last several decades.

The co-operation between the IOG, the Red Cross society and other services concerned in the DRVN has proved efficient in the elaboration of the programme, in the carrying out by stages of the project and in the completion of the work.

IOG COMMENTS ON IMPLEMENTATION

It seems difficult, not to say impossible, to affirm that one would have obtained better results if different basic options had been taken. Opinions may differ as to the importance to be given to the economic and psychological factors involved.

A critical study of the project should therefore bear chiefly upon the experience made, which may provide guidelines for the future.

It was thought that, in this project, all essential factors had to be known and taken into consideration right from the beginning. It was also believed that numerous unforeseen elements and changes in the implementation conditions would have to be faced. The IOG, as all other interested parties, had to organize themselves in connection with these problems. It was obvious that in many cases, uncertain conditions would necessitate close and confident cooperation between all interested parties, and there were many both on the Vietnamese and the IOG side. The IOG acted as coordinator between all Red Cross National Societies, several governments and various non-Red Cross Organisations on the donors side. It closely co-operated with the builders and manufacturers of houses, as well as with some National Red Cross Societies and various firms for the transport of the material.

In my opinion, the IOG personnel resources and their organization were well adapted to the task it had to perform. However there is always a margin for improvement and mistakes can never be entirely avoided.

The areas in which frictions could easily occur and in which it was necessary to make serious efforts and provide important resources were the following:

- information and public relations: it is difficult to decide whether improvements in these fields would have contributed to substantially increased assistance and reduced the number of mistakes which may be attributed to donors or manufacturers. However, it is certain that information and public relations play an important part in a project of this kind;
- co-operation with constructors and manufacturers: this on the whole worked well, shortcomings being due chiefly to lack of time; it would have been advisable to increase the IOG personnel in times of urgency;
- transportation and preparation of transports were important parts of the project because of their impact on economic factors, the maniability and the quality of the goods when they were delivered to their harbour of destination.

The part of the programme relating to transportation functioned fairly well, thanks in particular to the collaboration of the Poloceen Maritime Transportation Company. From the economic point of view, transport questions were relatively easy to solve: facilities were so restricted that market studies were easy to carry out and the decisions were easy to take. The preparation for transports is dealt with in the following chapter. Generally speaking, this is an area in which the advice of experts must be sought and in which a great amount of work is justified and profitable.

CONTROL

This important function was difficult to fulfill within the framework of this project, as many partners were involved in a complex system in which no previous experience was available. Control was expected to provide general and specific information, help to prevent mistakes and correct them.

Exchange of information between the two chief partners, the RCDRVN and IOG have been satisfactory from the IOG point of view. Essential problems fitted in within the framework of the responsibilities of both these partners. As far as the IOG was concerned IOG control was exercised in the following areas:

- construction details;
- production;
- composition of transport units, including equipment;
- protection of transports, marking of components and units;
- distribution of technical data (descriptions) and informations about transport;
- assistance in training for mounting;
- assistance given to controlling bodies on the Vietnamese side after construction.

The detailed control of the buildings was somewhat summary in view of the little time available. However some improved solutions resulted from it, concerning in particular the disposition of the rooms to conform with traditional furnishings: windows, other ventilation, dimensions and volume of the parcels, etc., or again a simplification of construction permitting a reduction of transport costs and facilitating the setting up.

Lack of control does not seem to have caused any major difficulties. Some important disadvantages could however have been avoided if more time and more qualified personnel had been available. Thus, for instance, some windows were too high to ensure good ventilation; also they open inward, thus reducing the available space. In some houses, the locks had identical keys, which renders the locks almost useless. The paint in the Japanese houses, specially made for rapid application on galvanized sheet iron did not stick everywhere, and part of the houses will have to be repainted.

The composition of transport units was also of great importance for handling on the Vietnamese side, and from the point of view of transport economy.

The most important conditions in this part of the general scheme related to construction. In one case it was possible to intervene in time to obtain good results by rapidly modifying the construction.

Control of the protection of transports was relatively efficient; some damage might however have been avoided if control had been more stringent, such measures certainly being justified from the economic point of view. The marking of parts and units had been well done, taking into account the customs followed in producing countries. However, it was not adapted to the projects conditions. This is a valuable experience, conducive to a few recommendations to which careful attention should be paid.

- All the parts should be marked so that their type and number could be easily identified at all stages of transport and mounting;
- Every transport unit should be numbered, carry a nominal designation and be accompanied by one or several copies of mounting instructions. Each unit should also carry indications on the units included in the same transport which are essential for the setting up of each house or series of houses;
- The same information should also be distributed to all responsible receiving bodies such as the Red Cross, and to the authorities in charge of transports and construction, in particular at the harbours of destination;
- In most cases, experience showed that one should not stint on expenses which would allow for thorough preparation.

Thanks to their talent for improvisation, the Vietnamese appear to have succeeded in facing most of the difficulties resulting from a sometimes imperfect control on the IOG's side. Loss of time and necessary efforts were not negligible for all that and the complications which resulted were among the most important difficulties encountered.

The IOG could only exercise a limited control on the training of the personnel in charge or setting up the houses. This part of the programme had to be left almost entirely to manufacturers. However the IOG gave instructions and cooperated to some extent in the selection and training of the foreign personnel employed.

It is highly probable that an IOG expert permanently available in Vietnam would have usefully assisted the Vietnamese in integrating in a coherent system the foreign experts taking part in the work at various periods. Such an expert would also have been able to submit suggestions to IOG as the work proceeded, so that changes could be made in the preparation and assist the Vietnamese in receiving and storing the material as well as in the preparation of shipments to the various building sites.

Control after setting up by the Vietnamese in co-operation with IOG experts made it possible to correct some mistakes in the mounting. It has also been possible to detect some defects in the goods delivered and to obtain redress from manufacturers. This collaboration should be pursued over a long time for periodic controls in order that all the stages of the project should be assessed.

CONCLUSIONS

The main interest of the project for the future is to be found in the way in which analyses, decisions, implementation and current evaluations have been made during the elaboration and the realisation of the project. This remark in no way reduces the importance of the technical experience thus obtained. It merely indicates that it is possible that technical solutions and experience may not only result but stem from non-technical factors.

The view of the Vietnamese on this subject and their cooperative spirit are clearly set out in the present Report. From the Indochina Operational Group's point of view, the following conclusions may be drawn:

- The co-operation with the Vietnamese Red Cross, authorities and experts, was most satisfactory. It made it possible right from the beginning to define the common objectives while taking into account the condition governing the project in Vietnam as well as abroad;
- The Vietnamese had to face difficulties, such as the uncertainties in delivery delays and other problems concerning transports and construction (these questions briefly dealt with here are taken up again further on in greater detail). The Vietnamese met these problems with efficiency and showed understanding towards their IOG partner;
- The Vietnamese planning provided a very satisfactory foundation for the IOG in defining technical specifications;
- It seems obvious that only a small number of constructors and manufacturers are accustomed to answer rapidly to non-routine requests;
- It seems also that standard dimensions of industrially produced building materials do not entirely correspond to specific needs;
- Cooperation between National Red Cross Societies and the Governments giving the necessary resources was excellent. With a few exceptions, National Societies respected the conditions which had been fixed.

In this connection, I think that the ICRC, the League, National Red Cross Societies as well as other organisations could profit in matters of relief from the experience thus acquired.

Excerpt from:

Almeida, R et al

"Programme des Constructions
Scolaires en R.S. Vietnam 1975-
78", Unicef, Lund 1983

Sommaire Avant-Propos

1
2—3

Première Partie: Rapport

Première Partie: Rapport

1. Introduction
2. Aspects Architecturaux
- 2.1 Répartition géographique des programmes
- 2.2 Caractéristiques générales des bâtiments
- 2.3 Programmation architecturale et utilisation des bâtiments
- 2.4 Terrains
- 2.5 Plans de masse
- 2.6 Répartition des surfaces
- 2.7 Orientation, ventilation et éclairage naturel

4- 7
8—15

3. Aspects Techniques
- 3.1 Problèmes et perspectives
- 3.2 Conception des éléments de construction
- 3.3 Aspects techniques par éléments

16—21

Deuxième Partie: Annexe Technique

22—24

Deuxième Partie: Annexe Technique

- Programme 1975: Descriptif
Ecole de Trúng Nhi
- Programme 1976: Descriptif
Ecole de Cat Linh C
Ecole de Nguyen Du
Ecole de Ha Ly
Ecole de Thuong Ly
Ecole de Truong Chieu
Nhi Vung Can
Ecole de Hoang Van Thu
Ecole de Tanh Thanh
- Programme 1977: Descriptif
Ecole de Phuoc Bui
Ecole de Truong Pho
Thong
- Programme 1978: Descriptif
Ecole de Trung An I
Ecole de Trung An II
Ecole de Nguyen Chi Thanh
- Programme 1975: Descriptif
SUD
Ecole de Long Dien A
Ecole de Tam-Hiep

28—32

4. Coût

- 4.1 Introduction
- 4.2 Réajustement selon l'inflation
- 4.3 Taux de change
- 4.4 Comparaison des programmes

5. Gestion des Programmes

- 5.1 Introduction
- 5.2 Echéance
- 5.3 Transport jusqu'aux ports du Vietnam, déchargement et stockage
- 5.4 Consultants techniques de l'Unicef et de l'Unesco

25—27

6. Conclusion

- 6.1 Spécificité des programmes
- 6.2 Aspects architecturaux
- 6.3 Aspects techniques
- 6.4 Coût
- 6.5 Gestion

Pendant la période 1975—1978, l'Unicef a aidé le Vietnam à construire environ 3 500 salles de classe principalement destinées à l'enseignement primaire. L'Unicef a également participé à d'autres programmes éducatifs en équipant, par exemple, des usines de fabrication de matériel didactique.

Le présent rapport concerne uniquement les activités ayant trait aux constructions scolaires et se base sur des données obtenues en Septembre 1978, au moment où la phase d'investissement se terminait. Ces données permettent une première appréciation des résultats de cette phase mais il faudra quelques années pour parvenir à une véritable évaluation de la valeur pédagogique de l'assistance de l'Unicef.

Plusieurs programmes, tous différents du point de vue architectural et technique, ont été

exécutés avec des bâtiments de un à deux niveaux, préfabriqués, semi-préfabriqués ou en construction traditionnelle selon les cas. Il est à noter que le coût unitaire et la répartition des coûts entre le donateur et le bénéficiaire subissent d'importantes variations et que la gestion des programmes, basée au départ sur le projet architectural, la logistique et la construction, est devenue de plus en plus dépendante du contrôle local.

À la suite de cette évaluation, l'équipe estime que la construction des écoles ainsi que leurs délais de fabrication sont conformes à des normes acceptables. La préfabrication ou semi-préfabrication a tendance à augmenter les coûts ainsi que les problèmes de gestion et d'entretien sans pour autant être justifiée par des avantages sur le plan

éducatif ou autre. Les écoles modestes, à un niveau, construites selon les techniques traditionnelles ont été les plus réussies. On aurait pu, cependant, améliorer ces constructions traditionnelles par des études architecturales adaptées aux conditions pédagogiques et aux sites locaux ainsi que par un meilleur calcul des besoins en matériaux. Par rapport au capital investi, il aurait été possible de répondre de façon plus satisfaisante aux besoins éducatifs, tant sur le plan quantitatif que sur le plan qualitatif. On pourrait créer un groupe d'études au sein du Ministère de l'Éducation afin de recycler de façon continue les données réunies par ceux qui utilisent les projets nouveaux. Dans le cadre de ce programme, l'Unicef et ses consultants pourraient poursuivre l'échange, déjà existant, d'expériences internationales.

6. Conclusions

6.1 Spécificité des programmes

Le programme de construction de salles de classe au Vietnam, avec l'assistance de l'Unicef, a été un programme de grande envergure réparti sur les 30 provinces du pays et étalé sur cinq années. C'était la première fois que l'Unicef entreprenait un programme d'assistance de cette ampleur dans un nouveau domaine d'activités. Quant aux responsables vietnamiens, c'était la première fois qu'ils avaient à gérer un programme intéressant autant de localités rurales, généralement à l'écart des grands axes de communication, et impliquant la livraison éche- lonnée de matériaux lourds venus des ports et placés sous contrôle central pour la diffusion des directives générales et la progression des opérations.

La situation générale du Vietnam en 1974 était complexe, surtout dans le domaine de la construction. À peine sorti d'une guerre, le pays commençait à ouvrir ses frontières à la communauté internationale et on savait très peu de choses sur la gestion du pays et sur les ressources locales disponibles. Il semble que non seulement l'Unicef mais également les autorités centrales de Hanoi n'aient eu que des connaissances limitées sur les ressources réelles des différentes provinces et communautés locales, ce qui peut expliquer, sinon justifier la façon uniforme dont les programmes ont été abordés. C'est dans ce contexte que l'équipe d'évaluation a estimé que, d'une façon générale, les salles de classe étaient d'une qualité tout à fait acceptable et que, de plus, les délais d'exécution étaient relativement courts. Il est manifeste que dans le cadre des programmes courants de l'éducation au Vietnam,

un grand nombre d'élèves profite au maximum de ces salles de classe qui sont utilisées de façon intensive en double vacation.

Le rôle joué par l'Unicef dans le programme d'assistance à la construction d'écoles primaires au Vietnam a considérablement évolué au cours de la période 1975—1978. À l'origine, le concours de l'Unicef était exclusivement requis par les responsables vietnamiens pour fournir des modules de constructions scolaires préfabriqués. Par la suite, une redéfinition des programmes d'assistance a permis de les diversifier. L'abandon du concept de bâtiment scolaire préfabriqué et entièrement importé a entraîné un abaissement considérable du coût de construction par bâtiment, ce qui a permis de redistribuer les sommes ainsi dégagées vers des activités complémentaires destinées à l'éducation proprement dite: équipements pour les écoles d'instituteurs,

bâtiments, machines et matières premières pour la fabrication de mobilier et de matériel pédagogique. Le financement de ces programmes complémentaires devait correspondre, dans son principe, à la prise en charge des besoins en mobilier et en matériel pédagogique pour les écoles construites avec l'aide de l'Unicef.

Le budget de l'Unicef destiné aux constructions scolaires a diminué de 6 millions à 1,5 millions de dollars américains par an sans que l'on enregistre de baisse dans le nombre des élèves concernés. L'amélioration de ce rapport entre les coûts et les bénéfices a été le résultat du dialogue qui s'est développé entre, d'une part, l'Unicef et ses consultants et, d'autre part, les autorités vietnamiennes. Le coût moins important à la charge de l'Unicef n'a pas été compensé par une augmentation de la charge du Vietnam.

Selon l'équipe d'évaluation, cette évolution positive aurait pu avoir lieu plus tôt si l'Unicef avait entrepris une analyse approfondie des buts de la coopération. C'est ainsi que l'on aurait peut-être pu éviter un programme vulnérable et coûteux tel que celui de 1975. On aurait pu également entamer plus tôt un dialogue sur l'idée d'entreprendre des activités complémentaires dont les élèves pourraient profiter sur le plan de l'éducation.

Du côté vietnamien, on pourrait peut-être proposer quelques améliorations sur le plan de l'organisation telles que la création d'un groupe d'études au sein du Ministère de l'éducation chargé d'élaborer des systèmes de construction, des éléments types ou des plans types, etc. L'Unicef pourrait participer, sous la forme de consultation technique ponctuelle et de documentation, à la construction de un ou deux prototypes expérimentaux (programmation, projets, normes, techniques de construction, utilisation des bâtiments, aménagement des espaces extérieurs) qui seraient ensuite repris par le

Vietnam dans ses programmes annuels de construction.

On peut également recommander de continuer les échanges techniques entre les techniciens vietnamiens et ceux de l'Unesco en vue de l'application des idées techniques qui apparaissent dans ce rapport.



6.2 Aspects architecturaux

Tout projet de construction est défini globalement par des décisions prises au stade initial. Dans le cas des programmes mentionnés, il nous semble que ces décisions ont été prises trop tôt et que les programmes ont été ainsi élaborés et bloqués sans que l'on ait obtenu de renseignements élémentaires ni sur les alternatives techniques et fonctionnelles ni sur les ressources disponibles auprès des communautés locales bénéficiaires de ces programmes. Si les autorités vietnamiennes ont pris note des premiers programmes de la préfabrication, elles n'ont appliqué aux programmes sud aucune des améliorations fonctionnelles des programmes nord et la préparation était plutôt rudimentaire. Dans l'intérêt du pays concerné, l'Unicef devrait insister sur une préparation complète et professionnelle des programmes de construction ultérieurs.

L'importante répartition géographique des écoles, tout en étant un atout supplémentaire, impose nécessairement une certaine adaptation locale des bâtiments en ce qui concerne le micro-climat, les conditions d'éclairage naturel, les sous-sols, les fondations, les bâtiments annexes, etc. L'absence d'une telle adaptation a pour résultat que le projet architectural général se base sur des spécifications de fonctionnement qui ne seront pas utilisées sur tous les chantiers (par exemple, les pare-soleils symétriques sur les deux façades compris dans le programme 1976). Cela implique également l'utilisation potentielle de bâtiments sur des sites auxquels ils n'étaient pas destinés.

Il est recommandé que les autorités vietnamiennes normalisent les dimensions et l'aménagement des sites car ceux qui ont été visités par la délégation ont révélé une absence totale de

normalisation logique. L'espace extérieur qui se trouve à côté des bâtiments pourrait être amélioré par les communautés locales à peu de frais, ce qui présenterait des avantages à la fois pédagogiques et esthétiques.

Une modification permanente des plans des bâtiments aurait beaucoup d'avantages du point de vue économique et fonctionnel. La surface de circulation des programmes varie considérablement (entre 13 et 30% de la surface construite), ce qui montre qu'un certain gaspillage a sévi, surtout dans le cas du programme 1978.

L'équipe d'évaluation estime, cependant, que tous les bâtiments fournis ont des caractéristiques suffisamment générales pour couvrir l'ensemble des besoins ultérieurs du système éducatif vietnamien qui est en voie de transformation.



6.3 Aspect techniques

Le transfert de la technologie vers un secteur de construction en voie de développement est assez complexe. Après examen rétrospectif, l'introduction de la technologie moderne de la préfabrication à travers la fourniture de salles de classe complètes ne semble pas très réussie. Il est difficile d'évaluer à quel point l'expérience des programmes 1975 et 1976 a pu modifier l'opinion générale des responsables vietnamiens vis-à-vis de l'utilisation d'ensembles préfabriqués ou d'ossatures en acier mais l'abandon de la notion d'ossatures en acier fabriquées localement pour les programmes sud indique une certaine prise en compte de cette expérience. Son évaluation reste, cependant assez difficile.

L'introduction de techniques nouvelles devrait se limiter aux projets prototypes. Par contre, les programmes plus importants dont la répartition géographique est plus étendue doivent se limiter aux techniques locales, ce qui n'implique pas forcément l'absence de dialogue sur ce sujet car les petites modifications peuvent souvent entraîner des améliorations considérables sur le plan des coûts ou de la qualité.

6.4 Coût

Etant donné la pénurie des ressources et le besoin impératif en écoles au Vietnam, les coûts doivent être réduits au maximum. Le coût unitaire à la charge du Vietnam ne varie pas beaucoup et le programme le moins coûteux est celui de 1977 pour les bâtiments à un niveau. Si l'on calcule l'apport de l'Unicef, c'est ce programme qui est le plus rentable. Il semble que la localisation d'une école doive être exceptionnelle, par exemple en centre ville, pour justifier les frais plus élevés d'un bâtiment à deux niveaux.

Le programme 1977 apparaît comme le plus économique, tant du point de vue de l'investissement initial que du coût d'exploitation. Des améliorations auraient pu y être apportées sur le plan du coût mais pour cela, il aurait fallu l'aide continue d'experts locaux et étrangers. De plus, on pourrait établir des coûts unitaires plafonds calculés selon les conditions des communautés locales. Ce coût plafond pourrait, désormais, servir de modèle pour évaluer d'autres projets ainsi que les variations dans les proportions des apports extérieurs par rapport aux apports locaux.

6.5 Gestion

Pour exécuter les programmes, l'Unicef et les autorités vietnamiennes avaient donné la priorité à l'achèvement des travaux dans des délais très serrés si l'on tient compte des conditions de travail qui prévalent dans le pays.

Pour le programme de 1975, les délais ont été respectés mais le coût par élève s'est révélé très élevé. Pour le programme nord (1076 salles de classe), l'Unicef a choisi de faire appel à plusieurs fournisseurs plutôt que de retenir un seul constructeur pour l'ensemble du programme et les coûts ont été considérablement réduits. Les problèmes de coordination du transport de matériaux et de livraison sur les chantiers se sont accrus mais ils ont été surmontés, dans l'ensemble, à l'exception d'environ 10% des écoles dont la construction devait être réalisée à des distances assez grandes du port d'importation et pour lesquelles les matériaux ont été acheminés avec retard en raison des difficultés de transport terrestre. L'achèvement du programme a été retardé d'au moins une année.

Le programme sud 1977 s'est terminé, dans sa majeure partie, avec un retard de six mois. Les

retards supplémentaires constatés sur quelques chantiers ont été dus, essentiellement, à des difficultés locales pour recruter des équipes de travail et pour compléter les matériaux qui devaient être fournis par les responsables locaux vietnamiens.

Le programme sud 1978 a rencontré plus de difficultés, d'une part parce que la menace de guerre extérieure a entraîné une modification des priorités et, d'autre part, parce que la construction sur deux niveaux exigeait des capacités de travail qui n'étaient pas toujours disponibles localement.

L'Unicef a dû faire face à des problèmes de spécifications qui ont été dominés de façon satisfaisante. Par contre, les problèmes d'organisation des expéditions, d'échelonnement des dates d'arrivée des matériaux en fonction du calendrier prévu pour la mise à disposition des matériaux sur les chantiers ont été plus difficiles à résoudre. La coordination entre les demandes faites par les responsables des constructions et les possibilités offertes par les fournisseurs de matériaux a été parfois insuffisante et la présence d'un coordinateur entre les différents services d'achats répartis à New York, Genève, Bangkok aurait facilité la tâche des services de réception et de distribution dans le pays. On doit à la capacité d'adaptation des services vietnamiens d'être parvenus à un achèvement quasi total des programmes 1975, 1976 et 1978 à la date de l'évaluation (septembre 1978). A cette époque, le programme 1978 était en cours d'exécution.

Il serait utile de compléter, ultérieurement, cette première évaluation de la phase d'investissement de la construction de salles de classe par une évaluation plus large de l'entretien et de la longévité des bâtiments. Cette évaluation pourrait, également, étudier l'utilisation pédagogique des bâtiments et l'influence qu'ils ont eue sur l'enseignement, l'utilisation des espaces ex-

PROGRAMME

DISTRIBUTION GÉOGRAPHIQUE

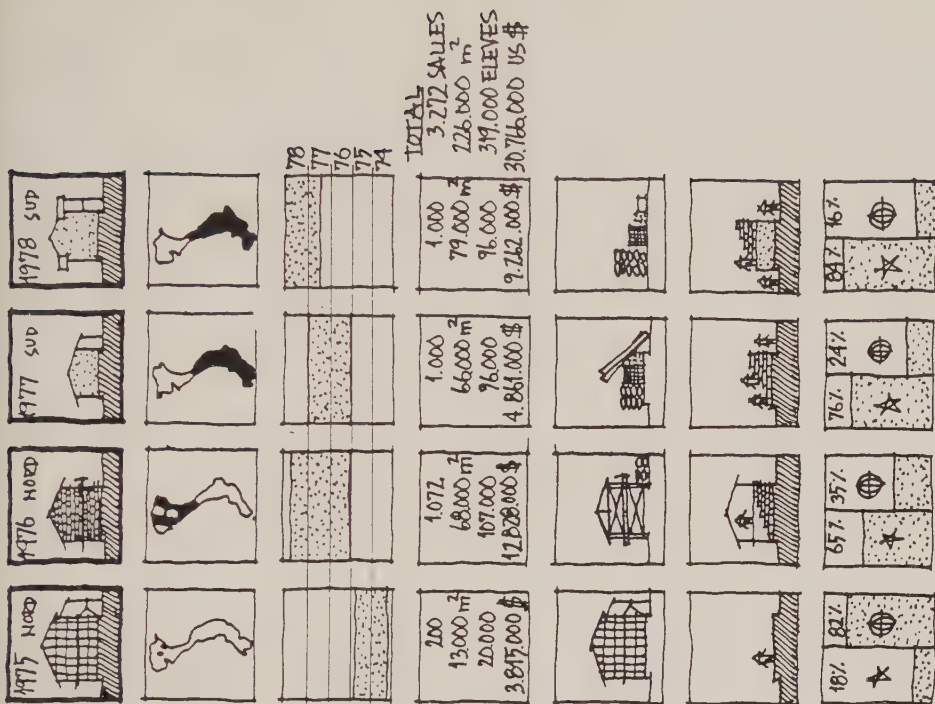
CALENDRIER DU PROGRAMME

NOMBRE DE SALLES SUR ZONE CONSTRuite NOMBRE ELEVES BENEF. CÔTÉ GLOBAL RSV/UNICEF

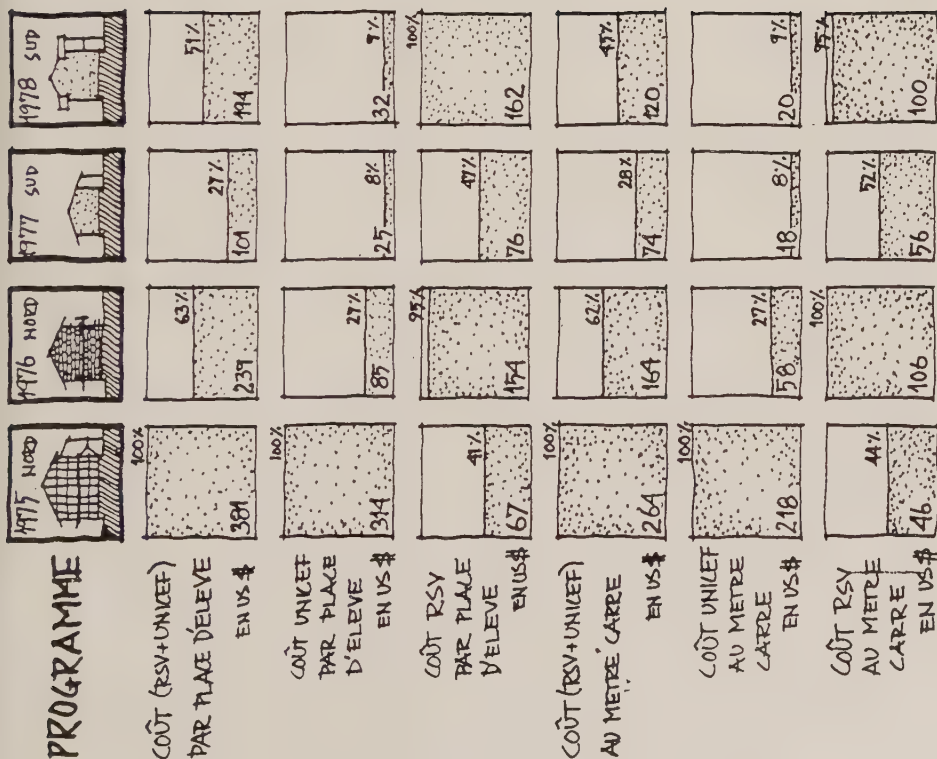
UNICEF INPUT

RSV INPUT

REPARTITION CÔTÉ RSV/ UNICEF



térieurs et l'intégration de l'école dans la communauté locale. Une telle évaluation pourrait fournir des renseignements sur la véracité des conclusions tirées de la phase d'investissement aussi bien que sur le rôle des programmes de constructions scolaires dans le cadre du développement général de l'éducation.



Excerpt from:

Hahn, R et al

"Village Water Supply in India -
An Evaluation Study of the E.L.C.
Water Development Project in Be-
tul, Madhya Pradesh", Lund Uni-
versity, Lund 1981

C O N T E N T S

PREFACE	1
1. INTRODUCTION	
1.1 The background of the study	2
1.2 Scope of the study	2
1.3 Methods	2
1.4 Limits of the study	3
2. WATER	
2.1 Water - a basic human need	3
2.2 Status of water supply	4
2.2.1 Internationally	4
2.2.2 Nationally	8
2.2.3 Locally	10
2.3 Drinking water - definitions	13
2.4 Benefits from village water supply	14
2.4.1 Health and hygiene	14
2.4.2 Living conditions	19
3. DESCRIPTION OF THE AREA	
3.1 Climate	21
3.2 Land use	23
3.3 Geology	24
3.4 Population	25
3.5 Water use	27
4. WATER DEVELOPMENT PROJECT	
4.1 Background	29
4.2 Development	32
4.3 Aim of the Project	33
4.4 Design	35
5. PERFORMANCE AND IMPLICATIONS OF THE PROJECT	
5.1 Drilling of tubewells	44
5.2 Groundwater quality	46
5.2.1 Water quality standards	46
5.2.2 Quality, health and general use	49
5.3 Handpumps	55
5.3.1 Condition of platforms and drainage	55

5.3.2	Conditon of handpumps	56
5.3.3	Maintenance of handpumps	58
5.4	Lokalization	60
5.5	A visit to two villages	65
5.5.1	Description of the villages	65
5.5.2	Water supply	68
5.5.3	The tubewell and its effect on the health	70
6.	DISCUSSION	
6.1	Introduction	73
6.2	Goal analysis	73
6.3	The Project's results	75
6.4	Efficiancy of the Project	78
6.5	Future of the Project	80
7.	SUMMARY	86
	APPENDICES	87
	REFERENCES	91

6. CONCLUSIONS

6.1 Introduction

The following is a summary of the results of WDP's activities during the past ten years. The results are related to the goals set for WDP. These are presented in chapter 4.3. Besides those taken from the annual reports, other goals are likely to have materialized. It can be expected that individual participants have had various conceptions of the real purpose of the project.

The analysis will follow a schedule based on the assumption that there is a relation between activity and goal and that the goals can be arranged hierarchically in such a way that a series of goals at a "lower" level can combine to achieve a "higher", more general goal. The lower level goals comprise the means to achieve the higher goals thereby in a continuous interchange (see figure 6.1).

This duality of goals/means, or in other words results/activities, implies that evaluation of achieved results must be supplemented by efficiency analysis. Thus, two questions should be posed:

- 1) Has the intended result been achieved? Has the project had the intended consequences?
- 2) Could the same result have been achieved in another, more efficient way?

6.2 Goal analysis

The first impression when attempting to analyze ELC's or WDP's goals is that the goals were never formulated in a clear and coherent way. In figure 6.2, an attempt is made to structuring at different levels.

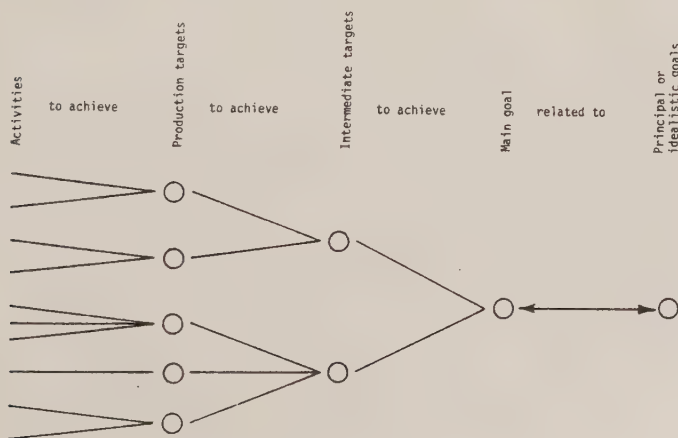


Figure 6.1 The road to the goal of a project

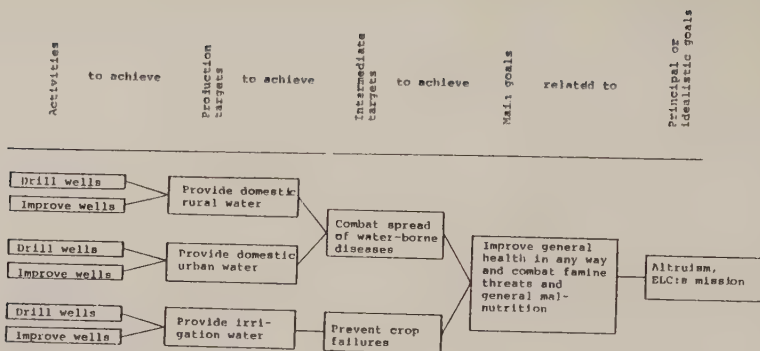


Figure 6.2 Goal analysis based on WDP's annual report for 1979/80.

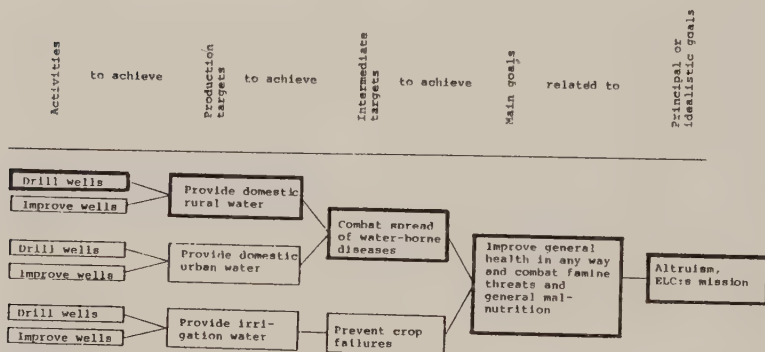


Figure 6.3 Goal analysis according to figure 6.2 indicating the limitations of this study. The limitations correspond to the main points of WDP's activities.

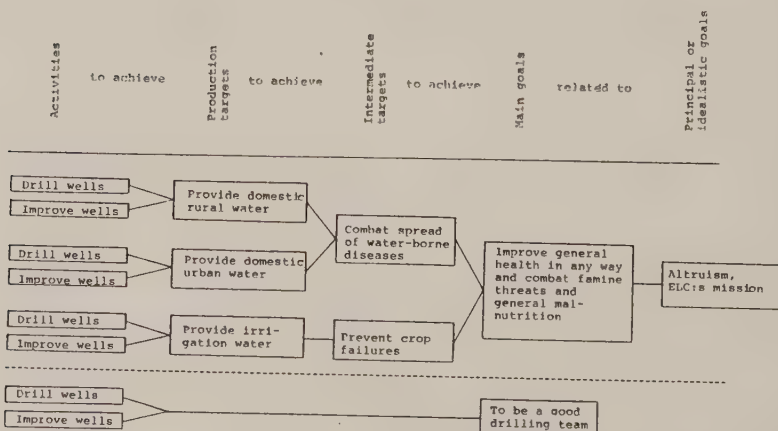


Figure 6.4 Goals analysis according to WDP's annual report for 1979/80 and below the dashed line, according to several employees.

From the diagram, one can indirectly conclude that WDP's activities (drilling and maintenance of wells) cannot be expected to be sufficient to have a significant impact on the standard of health. Further contributions are necessary. WDP's concentration on water for rural households is stressed as in figure 6.3. (Note here the limitations of this study.) WDP's "narrow" field of activities implies that the conditions for the achieved production goals alone to lead to fulfillment of higher level goals are lacking. For this to occur the conditions in a specific case would have to be exceptionally favourable in such a way that pure water was not only essential but sufficient to improve the standard of health.

This has certainly not occurred in most cases, to which the case studies can attest (chapter 5.5). WDP's personnel have often expressed a "realistic" interpretation of what the Project's intentions should be. They point out that the principal purpose is to constitute a well-functioning organization for well-drilling (see figure 6.4).

The managers of ELC and WDP seem not to have discussed the question of goals with individual staff members, which becomes apparent in the vagueness of explanations WDP's field personnel give for WDP's concern for a particular village's water problems.

We recommend to ELC and WDP to carry out a systematic goal analysis. Such an analysis constitutes an essential base when continued activities are planned. The analysis should particularly consider how the relation between production targets, intermediate targets and principle goals could be improved through supplementary activities. These could be carried out, in part in villages which have already obtained water through WDP, and in part in other contexts where more comprehensive programs could be implemented.

6.3 The Project's results

The Project's results or "effects" are discussed in chapter 5. Briefly, the planned activities have been carried out. A large number of new wells have been drilled and existing wells have been maintained and improved. The principal production targets - to provide domestic water in rural areas - have been achieved to a great extent. In addition to this, WDP in Betul is, as an organization, regarded as an important asset. The relation of the established functions to the goal hierarchy is evident in figure 6.5. It appears, however, that a continued engagement on the part of WDP is necessary to keep the opened wells functioning. Household water is still mainly the women's responsibility and their position in the village is apparently not always strong enough to assert the necessity of continuous maintenance of the pump to be provided by the village (the men).

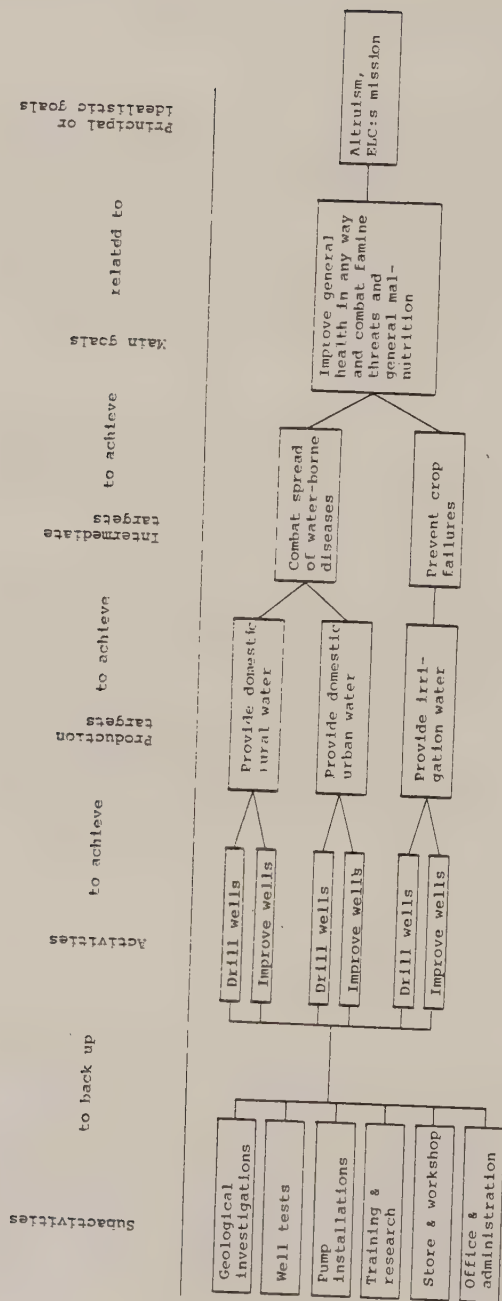
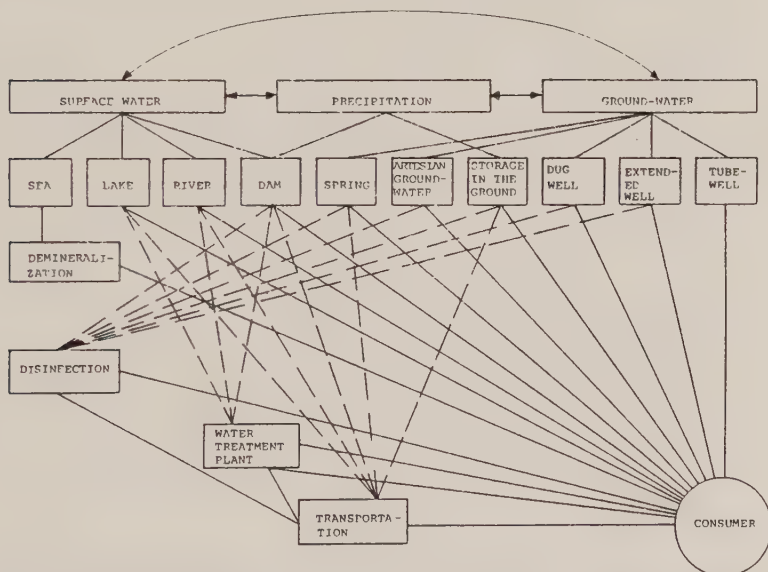


Figure 6.5 Sub-activities of WDP

This study, chapter 5.4 and 5.5, also indicates that a revised standard comprising less than 250 persons per handpump probably would result in increased percentage of households using the tubewell and a better continuity in the utilization. Further two or more tubewells means a spread of the potential hazards of infection in the case that one water source would be polluted, as the share of population exposed is less than in the case of only one handpump per village.

For water supply, a great variety of arrangements exists, figure 6.6, despite local limitations.

As an alternative to economically demanding alternatives as large-scale transport of water or technically and administrative advanced treatment plants or dam-constructions, tubewells seem to be an appropriate solution. In some cases the use of shallow groundwater, however, is a feasible alternative at present. In the long run the usage of existing surface water resources is inevitable.



Water supply can be arranged in a great number of ways. Water can be taken directly from surface runoff, collected from precipitation or withdrawn from dug or drilled wells. Problems with water shortage can furthermore be solved by regional transportation of water and by different levels of treatment to convert polluted water into safe drinking water.

The quality of the water in the catchments varies considerably, with environmental and other factors. Schematically, however, the alternatives above are organized according to increasing quality of raw water. This classification is based on general rules, such as:

- Surface water contains more suspended matter, from algae growth, surface runoff, airborne pollution etc.
- Groundwater is better in view of bacterial quality and content of suspended solids due to filtration and microbiological activity in the ground.
- The content of chemical constituents is higher in groundwater, because of mineralization.
- Deep groundwater generally has a high bacterial but a low chemical quality as a result of long detention time in the aquifer.

Figure 6.6 Spectra of alternatives to provide water supply:

"To combat the spread of water-borne diseases" stands out at the intermediate target level, as the most important purpose of WDP's activities. There is, however, little evidence showing that this goal has been achieved to any significant extent. The problem appears to have two dimensions. Firstly, the relation between health and water from drilled wells is not at all obvious for most water consumers. Unwillingness to go out of one's way to get pure water is common and furthermore, there is a lack of awareness of the consequences of mixing pure and infected water. WDP should therefore go further into information about pure water and health. Secondly, it is in many cases certain that the transition to use pure water alone does not have a positive effect on health. Thus, pure water constitutes a necessary but not sufficient condition. WDP should therefore supplement its well-drilling activities with latrine and sanitation programs. Improved diet could also have a positive effect, possibly as a result of improvements to agriculture. Other possible supplementary efforts are discussed in chapter 6.4.

It cannot be claimed that WDP's efforts to date have alone been able to imply that the principal goal - improved health - has been achieved. The presumed principal or idealistic goals of ELC in India - to missionize and operate altruistic activities - might have been somewhat furthered by the WDP. The staff of WDP does, however, not appear to have been given a clear account of the reasons behind activities in connection with installation or deliveries of pumps.

There can be reason to note that if WDP's motives are altruistic, then the future activities should be focused on water supply and health in the poor and remote villages. This implies a restrained attitude towards obtaining larger drilling equipment and instead concentrating on small, light units. Furthermore, a comprehensive drilling operation on a more or less commercial basis can imply competition on unequal terms with commercial outfits. This might give WDP and particularly ELC a negative image and thus counteract WDP's/ELC's idealistic goals.

6.4 Efficiency of the Project

The Project's efficiency has been discussed and elucidated in chapter 5. It can be said that the Project appears to have been run in a skillful and creditable way up to the level of production targets. Since the higher level goals have not yet been achieved, it is too early to appraise whether or not WDP's activities can also be as efficient at those levels.

Considering the circumstances, such as rural areas with incomplete hydrogeological data compilation, deficiencies in the infrastructure etc., the Project as a whole can be considered successful; even taking into account other activities, which were considered for closer examination beyond the scope of this study, like extension drilling in open wells and provision of irrigation water.

However, some remarks and recommendations should be added:

- 1) Supplementary measures with e.g. VLF registration are recommended for geophysical investigations.
- 2) An earlier proposal for the prevention of surface pollution by installing casing to at least a depth of 50 feet ought to be considered further.
- 3) Organization and evaluation of available geological data from the past 10 years of operation, e.g. mapping of the groundwater table and a regional overview of aquifer borders, is recommended. Data other than that obtained directly from WDP is available from PHED and other contractors.
- 4) The supply of groundwater is by no means unlimited. Extended basin studies and determination of groundwater age by analysis of H^3 or other isotopes is recommended as a means to better understanding of groundwater turnover, in order to enable long term planning.
- 5) To increase the rate of successful bores, the possibility of utilizing high-pressure pumping for opening rock fractures in low-yield bores could be adopted. The CP-7000 rig is assumed to have the capacity required.
- 6) A more comprehensive chemical and biological water quality control, at least in newly drilled wells, appears to be justified by the fact that extreme concentrations of chemical substances hazardous to human health occur, as well as high numbers of fecal bacteria.
- 7) Intercalibration with other laboratories is recommended to determine the precision and accuracy of analysis results.
- 8) Demarcation of areas with excessive fluoride concentrations, as suggested in the previous study on chemical water quality (1974), could be considered together with point 3 above.
- 9) Generally, tubewells are drilled because traditional water sources are far away, run dry in the hot season or are bacteriologically unsafe. Providing tubewell water in order to avoid pollution could be seen as approaching the problem from the wrong end, leaving the source of pollution undisturbed.

In several cases it may suffice to examine the causes of pollution and protect existing shallow open wells by providing adequate, concrete works and a handpump. This is believed to be the best solution if deep groundwater is undesirable for reasons as in point 8 above. Consideration of pollution-preventive operations appropriate to the Project's present design is recommended.
- 10) The condition of platform and drainage is expected to be of importance to water quality. As the study indicates that about 70% are not in proper condition, further effort in this area is recommended.

- 11) The handpump survey showed that about 75% of the pumps were in working condition, irrespective of district and pump-type. The India Mark II, however, was to a significantly larger extent in good condition than other pump-types, which although they functioned were in need of repair. The superior quality of India Mark II is thus verified.
- 12) More than one handpump per village and less than 250 persons/pump is desirable. This would reduce the distance to the pump and the time to wait and add to the security if one pump should break down. A higher degree of utilization of the tubewells and a better continuity could be expected, both factors important to the health.

6.5 Future of the Project

The Project's working committee suggests the following actions to be adopted in the future development programme:

1) Procurement of a new heavy drilling rig

The two old Halco 625 rigs are now uneconomical to operate. It is suggested that they should be scrapped, after obtaining required permission from government authority. It is further suggested that a new C.P. or Drill. Tech. rig should be obtained to replace the old ones.

2) Reconditioning of the second Wabco unit

It is suggested that before the commissioning of the unit, suitable support equipment also should be obtained.

3) Petro-pump project

A few such pumps were installed in the district two years ago. It was found that the villagers prefer this pump over other models. It is suggested that the Project should include a suitable rig to drill small diameter bores and that a number of 100 petro-pumps should be installed in the rural areas of the district.

4) Training program

A long term program on a regular basis should be formulated, to give training to young boys in order to make trained hands available to the water well drilling organizations in the country. Such a program is necessary as this sort of training is not given anywhere else in India.

5) Rural community development

A program should be worked out to help the poor and needy of the district. This project can be started initially in a small area near Betul, where the water resources can be developed by WDP to provide drinking and irrigation facilities. Later on the villages can be adopted for overall development of the area, with the help of the villagers.

6) Agriculture demonstration farm

The set up of farms in various areas of the district is suggested to exhibit land and agriculture development. The size of the farm should be such that development techniques and agricultural practice exhibited on the farm can be adopted by the small and marginal farmers.

7) Soil testing

A testing laboratory should be set up at the headquarters in Betul, to undertake soil analysis.

8) Involvement of the Church workers

During routine field work, the Church workers usually come into contact with the villagers. They should be requested to teach the villagers about the importance of clean water, the connexion between clean water and water from the handpump, the importance of maintenance of their pump and of reporting breakdowns to the concerned officials and agencies. WDP will arrange short term training courses for those involved in this program and will also supply basic information and literature for distribution in rural areas. WDP will also participate in work camps organized by the Church leadership, provided such camps can be organized in rural areas to explain to villagers the importance of clean water and hygiene.

In the light of this study, two additional suggestions are made:

9) Sanitation

It is suggested that investigations of sources of pollution should be performed and that measures should be taken to control them. The actions could involve construction of latrines and sewers, disinfection and other undertakings that would appear appropriate under the circumstances.

10) Basin studies

Studies to obtain a regional overview of the groundwater resources available are suggested. Studies of the age of the groundwater and of the aquifer limits would provide a basis for consideration of re-charge capacity and what amounts of water are possible to utilize.

A compilation of some expected positive and negative implications of these actions is given below. The table is not at all complete, but may serve as a basis for further discussion.

Action	Implications
1) New heavy drilling equipment	+ Will further increase drilling capacity. + Maximum use of the machine could be expected as the organization is suitable for this kind of equipment - Drilling in other districts away from Betul will be necessary to make use of its full capacity. This may create administrative problems. - The accessibility of the machine is limited. - The cost of maintenance and supply (fuel etc.) is high. - The complexity of the machine and the support vehicles and administration needed to keep it running, gives a fairly large number of employees, or manhours, per hole bored.
2) Wabco unit	+ The cost is less than the purchase of new equipment. + The kind of work, which the machine is suited for, is requested. - As the machine is not new, maintenance and repair time and costs could be expected to be high.
3) Petro-pump project	+ The small diameter holes are easier and less expensive to drill. + The pump is appreciated in the villages. + The low weight of the pump mechanism facilitate maintenance work. + The small drilling rig required increases accessibility. + Low weight of pump material, of drilling rig and of supply (bores, casing, etc.) lowers running costs and cost of transportation. - The pump construction has several weak points that have not yet have been proved to be overcome. - The resistance of the membrane in the pumping element has not yet proved high enough.

Action	Implications
3) Petro-pump project, cont.	- The energy required to lift water according to this principle is higher than with conventional methods. - More field-tests of the whole system - drilling rig, handpump and maintenance - are desirable.
4) Training	+ Training programs are rare elsewhere in India. + The experience collected by WDP during ten years of operation and the facilities at their headquarters make WDP well suited for such undertakings. - The experience of WDP may be limited by geological and other specific conditions of the Project's working area, such as the fact that only deep groundwater is considered. In other areas, e.g. Bangladesh, other methods could preferably be used for exploitation of shallow groundwater.
5) Rural community development	+ Since the provision of safe water is a necessary but not a sufficient part of a development program, more comprehensive efforts of this kind would most certainly be effective. - Being a technical organization, WDP has no experience in this field. - Other institutions of the Church have already adopted similar programs. - Cooperation with other institutions would be appropriate. It is questionable whether WDP or medical, educational or other bodies should assume the main responsibility. - Considerable planning is needed to avoid negative effects like for instance that the population of this area not would get a sense of being privileged and therefore demands future care.

Action	Implications
6) Agricultural demonstration farm	+ Agricultural aid, regarding small farmers, is needed but could be seen as a part of number 5 above. - Similar programs already exist within ELC. - The knowledge and experience of WDP in this field are limited.
7) Soil-testing	+ Laboratory skill and agricultural knowledge are already available within the Project. + The program does not include any large investments. + The activity could very well be economically self-sufficient. + For the individual farmer, fairly important achievements could be made.
8) Involvement of the Church workers	+ Information of the importance of clean water etc. is a substantial part of the water development work. All canals available ought to be used.
9) Sanitation	+ The source of pollution is attacked, which is the only logical strategy. + Together with protected water sources, this will help to prevent the spread of diseases. + These kinds of action are inevitable in the long run. + The environment will be protected, both the immediate surroundings and larger areas. + The possibilities to protect and utilize traditional water sources would improve. - The acceptance among the people of these systems is low. For cultural and other reasons, people are not eager to make use of sanitary facilities. Simultaneous educational efforts are therefore necessary. - The knowledge of WDP in this field is incomplete and it lacks the design for it.

Action	Implications
10) Basin studies	+ Planning for maximum utilization of existing water resources necessitates a balanced withdrawal of groundwater. + Problems related to future overuse of certain aquifers would be prevented. - The work is time-consuming and expensive. - Highly skilled professionals as well as sophisticated measurements and analyses would be required.

7. SUMMARY

The preceding study is an evaluation of and for the Water Development Project (WDP) of the Evangelical Lutheran Church in Madhya Pradesh, India. The study was carried out by the Department of Water Resources Engineering, Lund Institute of Technology, University of Lund, Sweden. WDP has been, for the past 10 years, drilling wells mostly for villages, but also for industries, institutions (primarily within the church) and also for irrigation. At present, the project employs 87 people and operates 4 heavy drilling rigs. It works on a non-profit basis and investments and parts of operational costs are financed through the Lutheran World Federation (LWF).

The evaluation has been limited to a study of water supply for household purposes in villages through well-drilling and installation of hand-pumps. The study is based on available material from WDP and a survey of 55 randomly chosen villages and a detailed study of 2 villages that are typical for the region. WDP employees and village residents in the district of Betul were interviewed in connection with visits.

The research group finds that WDP has built up a well-functioning organization for drilling wells. This organization together with the acquired experience in water problems and well-drilling in the region are valuable resources for the future. The group considers, however, that it is uncertain whether the health standard in the villages involved has been improved. Water is an essential but not sufficient prerequisite for health and development.

The group recommends the following:

- that certain standards and procedures of the practical work be altered.
- that drilling for groundwater be supplemented by efforts in other fields.
- that LWF and ELC/WDP carry out a systematic goal-analysis of their activities.

Excerpt from:

Reuterswärd, L

"Seminar on Children's Hospital
and General Hospital in Vietnam -
Evaluation of the Investment Phase/
Seminarium om barnsjukhus och all-
mänsjukhus i Vietnam - en evaluate-
ring av investeringsfasen", Lund
University, Lund 1982

INNEHÅLLSFÖRTECKNING	Sid
1. SAMMANFATTNING	1
2. INLEDNING	6
2.1 Allmänt	6
2.2 Metoder	7
2.3 Begränsningar	9
3. MÅLANALYS	11
4. EGNA INSATSER	14
4.1 Allmänt	14
4.2 Hinder	15
4.3 Ökad effektivitet	16
4.4 Personlig u-landserfarenhet	16
5. PRODUKTIONSMÅL	18
5.1 Inledning	18
5.2 Problemformulering	18
5.3 Projektering	19
5.4 Byggande	20
5.5 Installationer och utrustning	20
5.6 Idrifttagande	21
5.7 Organisation	22
6. DELMÅL	23
6.1 Inledning	23
6.2 Överföring av planeringsmetoder av byggteknik	23
6.3 Yrkesutbildning av byggarbetskraft	24
6.4 Standardisering av installationer och utrustning	25
7. HUVUDMÅL	26
7.1 Barnsjukhus	26
7.2 Allmänsjukhus	26
8. ÖVERGRIPANDE MÅL	26
9. SLUTSATSER	27
9.1 Allmänt	27
9.2 Bistånd till vem?	27
9.3 Kunskapsuppbyggnad	29
9.4 Kunskapsvård	31
9.5 Byggt bistånd	33
9.6 Hur gå vidare?	34
9.7 Slutord	35
- Folder Vietnam	
- Faktablad barnsjukhuset	
- Faktablad allmänsjukhuset	

SUMMARY (English translation)

A great portion of Swedish aid goes, in some form, to construction activity. This study aims at trading back experience gained from two major construction projects in Vietnam; a children's hospital in Hanoi and a general hospital in Uong Bi. The purpose is to make gained experience accessible for future construction projects in order that the same result could be achieved 1) at a lower cost, or alternatively 2) improved result at the same cost. The study is principally directed to SIDA's programme officers and consultants. This report completes the study of which the most important element was a seminar arranged for the actors in the hospital projects.

The study is focussed on actors. In addition to the seminar, the written contributions and certain key interviews of the Swedish actors constitute the most important sources of information.

The study is limited by the fact that the Vietnamese had not compiled their experience at the time of investigation. The study deals solely with the investment phase of the projects.

The study is based on an interpretation of the goals which make up the basis of the investment decisions:

Principal goal	to promote health
Main goal	to build hospitals
Intermediate targets	to transfer planning methods to transfer construction technique to train construction workers to promote standardization to educate operation personnel

The study shows that systematical differences of interpretation and evaluation of the activity exist, depending on the actor's role in the project, and whether the actor has worked in Sweden or in Vietnam. The former has, without exception, less experience in developing countries and is more positive toward final results than the Vietnam-based actor.

The production goals correspond to the various stages of the building process. The formulation of problems occurred after limited preliminary studies. Composition of the programme was carried out by the same consultant for both hospitals, in consultation with Vietnamese experts.

Design was carried out in the same manner, by two independent consultants of which one had earlier been responsible for the programme. The work was pursued under the pressures of time and cost. The hospitals were built under Vietnamese direction but with Swedish advisors. Besides, Sweden contributed with construction equipment and certain materials. Sharing responsibility created certain problems, but the work could be continued and completed in a comparatively limited time.

Installations and equipment were delivered from Sweden and installed, in part, by Swedish contractors. Adapted technique has been difficult to procure, and certain systems are consequently vulnerable. The operation phase had not yet begun at the time of this study. However, the local personnel seemed to have good basic education and competence.

The organizational structure of the projects has been of the conventional type. The Swedish direction of the project has for a long period been localized in Stockholm. Many actors question both this point, as well as the rather "short-termed" responsibilities of the consultants.

The intermediate targets appear to have been of limited importance for both of the parties concerned.

Transfer of planning methods and construction technique has indirectly occurred in succession to the on-going activity. Special efforts have not been made to generalize this knowledge.

This also applies in regard to vocational education of the construction workers. The gained skills risk being of little value if similar buildings are not built in the near future.

Standardization of installations and equipment has not been realized since the Vietnamese authorities have not carried out such activity. The main goals, to build a children's and general hospital respectively, has been fulfilled, with the reservation that the general hospital is not yet serving its intended target group; mine workers' families.

The value of the hospitals in regards to the principal goal - to improve health - cannot be appreciated at present. Their value is completely dependent on the direction of Swedish aid during the coming years

Conclusions

- The means of aid must go through a whole series of intermediaries before they can reach the target group. It is of importance that agreements, among other things, are formulated in such a way that weaker parties are protected, even those within the receiving country. This implies a more business-like relation to the middlemen.
- The Swedish field personnel ought to be given a more clearly-defined role. The distribution of responsibility must be bound by agreement. It is presumably justified to either choose a "turn-key" model for the Swedish engagement or to place a larger part of the responsibility for formulation and realization on the receiving country.
- Extension of knowledge must be promoted. This can take place through devotion of sufficient time and resources. Decisions should not be made prematurely if the gained experience is to be of benefit. Furthermore, SIDA should consciously develop a strategy for the choice of technology. This could imply among other things, that no essential technical solution should be accepted if the functional value did not stand the test even without sophisticated technical maintenance and spare parts.
- Extension of knowledge also implies conscious and long-range concentration on research and development both by SIDA and consultants.
- The value of sustenance of knowledge ought to be given more attention. This should be promoted in projects by allowing consultants to follow up their intentions. Gained experience can be utilized if projects are suitably well-timed. The selection of consultants during the decision-making and design stages ought to have competence, rather than cost, as the most important criterion. This could take place through the help of competitions, for example.
- As customer, SIDA has a definite responsibility for extension of knowledge and transfer between projects. This can either be handled by internal personnel or through an independent and competent reference group.
- The way in which the SIDA manual of support preparation discusses goals and goal hierarchy is not quite so well adapted to construction projects carried out through aid. The model, for example, does not take the difference between the investment phase and the production phase into consideration. SIDA should develop an understanding of the role of the construction projects carried out through aid. In particular, the relationship between building design and operation costs should be studied.

- The merit of the hospitals is wholly dependent on whether or not SIDA supports the operation phase. Such support appears to have a very advantageous cost-benefit relation.
- Methods and routines for tracing back experience gained from aid projects ought to be further developed.
- The evaluation of the hospital projects could be continued in two ways. Vietnam should be encouraged to compile their experience gained from the investment phase. Moreover, a comprehensively composed group should evaluate the hospitals after a few years of operation.

Excerpt from:

Johannisson, B et al

"In the Glass Empire - An Evaluation/I Glasriket - en utvärdering", Lund University, Lund 1982

Innehållsförteckning

Förord	3
Innehållsförteckning	5
Sammanfattning	7
Kapitel I Inledning	13
Kapitel II Glasriketbygden	19
Kapitel III "I Glasriket — Människan—Miljön—Framtiden"	25
Kapitel IV Deltagarna	35
Kapitel V Historiecirkelarna	39
Kapitel VI Framtidscirkelarna	49
Kapitel VII Om utvärdering	65
Kapitel VIII Sammanfattande diskussion och slutsatser	77
English summary	89
Bilaga A Faktablad	95
Bilaga B Enkät — sammanställning	111
Bilaga C Seminarium	129
Bilaga D Referenser	135

English summary

Introduction

"In The Glass Empire — The People — The Environment — The Future" is one of Sweden's major study circle projects. It is presently in the finishing stages and the Lund Committee on Habitat and Development Studies (LCHS) at the Lund University has, as requested by their overseers, evaluated the project.

In order to carry out the evaluation a working group was formed. Lars Reuterswärd, project leader, and Maria Nyström, research assistant, represented LCHS. Bengt Johannisson, assistant professor of Business Economics, represented the University in Växjö and aided in broadening the competency of the project. The members possess varied areas of knowledge including, for instance, general experience of evaluations, experience from earlier participation in study circle projects, as well as knowledge of development of small firms. The latter regards some of the glassworks in question, among other firms. A pilot group was appointed with representatives from Lund University as well as from the project "In The Glass Empire".

Planning of the evaluation

The principle limiting factors of the evaluation have been the time limit — six months — and the economic resources. A working plan for the evaluation was developed where the work was chronologically divided into four phases according to the following:

Figure 2: Work plan

I	II	III	IV
COORDINATION	INVENTORY	SEMINAR	COMPILATION
-Building a pilot group -Work planning -Developing work methods -Organizing meetings	-Field work (interviews, inquiries, observations)	Evaluators, study circle representatives, project leaders, local authorities, business firms...	-Reporting (lay-out, clean copy, printing)
PLAN	MAP OUT	GENERAL CHECK	REPORT

In the program phase the work was planned, work methods chosen, etc. The main collection of information on work of the circles, effects and results took place in the following phase, the inventory phase. Thereafter, a major seminar was held in order to supplement the information as well as convey experiences to study circle participants and leaders. During the last phase, the specification, the working material was analysed and the report produced.

More than four hundred persons have taken part in the study circles. Approximately thirty circles have been formed in twenty-two districts. In order to get a better general view and be able to go deeper into the work of the circles, a selection of districts and circles has been done. The selection has been carried out in such a way as to have a wide distribution of a series of key factors. We attempted to get a large geographic distribution as well as choose districts of varying size and character, especially bearing in mind the type of glassworks which existed, for example, family businesses or works owned by a group of business firms. Furthermore, circles were selected having varied levels of activity, and extent of success. A few of the districts have been familiar to the working group. Eight districts were selected for the evaluation. Two must be omitted while one district served as trial district for the inquiry.

The Glass Empire

The major part of the Swedish hand-made glass industry lies in Småland, a province in the southeast part of Sweden. Ninety percent of job opportunities within the Swedish glass industry are located in the region which bears the name Glass Empire, and which is comprised of four municipalities.

During the recent years, the glass industry has experienced dramatic changes. However, development of the glass industry shows that the branch has constantly been instable, with shut-downs, bankruptcy, etc. During the seventies the community made diverse efforts in order to stimulate the glass industry, for instance, company consolidation and export investment. Many varied investigations regarding development of the industry have been made, the latest of which comprises business economical and local/regional effect analyses. In spite of the fact that the production of hand-made glass has decreased, the productivity has increased during the seventies. In certain local labour markets the glassworks dominate entirely. The trade union organizations have proposed coordination of development efforts with the aim of strengthening development of the branch. The proposal, however, has not won the favor of the government authorities.

The glass industry is dominated by two companies: Orrefors and Kosta-Boda. These answered for two-thirds of the employment within the Swedish ornamental glass industry and household glass industry (1979). There are also several independent glassworks. It has been shown that these have good possibilities of surviving. One explanation is that they are locally established, another is that they have found niches in the market within the production of glass.

"IN THE GLASS EMPIRE - The People - The Environment -The Future"

The Study circle project "IN THE GLASS EMPIRE — The People — The Environment — The Future" started in 1978 with the aim to improve the region's situation. It is the result of a cooperation on the regional level between The Workers' Educational Association and The Factory Worker's Association. The project has consisted of two study circles. After mapping out the situation of the workers of the glassworks in a historical perspective, studies were continued about the future of the district. The Workers' Educational Association wrote in their program paper that "the study circle will become our symbol for our belief that people can realize a common idea".

"In The Glass Empire" has many financiers. Besides the Swedish Factory Workers' Association and The Workers' Educational Association, other major contribu-

tors are The National Council for Cultural Affair and The Swedish Work Environment.

The study circle project has been conducted by a pilot group which has had a governing function and made the major decisions, managed the economy and has had external contacts. Each study circle has otherwise been free to pursue their studies in the most suitable way decided. Many outsiders took part in the project, more or less actively. The University in Växjö as well as Lund University, among others, have taken part. Some students from the School of Architecture wrote their examination paper on the project "In The Glass Empire".

Cultural and massmedia activities

The extrovert activity of the project has been very great. An LP-record has been made, for example, with music from the glassworks. A musical was performed in cooperation with the State Theatre Ensemble in Växjö, the centre of the region. Exhibitions have been arranged both in larger engagements such as in connection with The Swedish Factory Worker's Association Congress in Stockholm, and in minor exhibitions the circles have had which show their work. However, the most important result is a series of books which the history circles have given out about their district and their glassworks.

The recruiting to the circles has taken place in many different ways: via newspapers and local radio, study programs for the union and The Workers' Educational Association and through personal recruiting. The union has, however, aswered for the recruiting activity on the factory premises.

The project "In The Glass Empire" differs from many similar projects in certain regards. It has been initiated locally, and this, moreover, took place before the firms gave notice for shut-down. The project is extensive, regarding the number of persons who took part, and it has continued since 1978.

The participants

Approximately one-third of those who returned the inquiry took part in both study circles, i.e. the future, respectively history, circles. The motives were many to why one participated in the circles. In respect to the history circles, one wanted to learn more about the history of the district and the firm. Many of those taking part in the future circles had expectations that the circle would be able to increase the possibilities of saving the district and the firm.

Few women and young people took part in the circles, the majority comprising of mostly elderly people. The average age was forty-four. There was, however, a higher percentage of elderly participants in the history circles than in the future circles. Most of the participants had connection to the district where they took part in the study circle, and many worked in the districts' glassworks. Furthermore, the union activity among the participants was high. They were particularly engaged within political and union organizations, but even within sports and outdoor life.

The history circles

The interest for participation in the history circles was very large. Thirty-two circles have been formed in twenty-two districts, and in a few districts more circles were set up. The aim of the first set of circles was to bring the history of the glassworkers to light, and to give the labour movement back its identity.

The history circles have many similarities regarding the study circles' structure and results. One explanation could be that the circles began work under similar conditions. The glassworks districts also have a common history in many respects. The work in the circles functioned freely and without a working plan or time plan. The leaders of the projects gave a few directives. Traditional study material was not used. The material which the circles produced themselves — photos, interviews, protocol

— should instead serve as support. The leaders of the projects recommended, however, a few books as sources of inspiration. The glassworks and the community outside of the glass foundry has been studied in the circles. A wide register of subjects was dealt with: different glass-production methods, ownership, working environment, union life and business life, the appearance of the community, etc. The main issue studied in the circles varied from circle to circle, but it can be pointed out that most interest was generated towards life outside of the glass foundry. This is shown in the history books which the circles published. (15 books out of 22 planned are published.)

The future circles

Having mapped out the history of the glassworkers, the second study circle "The Struggle for the Jobs" continued in the autumn of 1975. It dealt with the district and the future of the glassworks. The areas of study was partly the hand-made glass industry with production, sales and ownership conditions, and partly the on-going community development where tourism, regional and municipal planning as well as housing was studied. As in the history circles, one was allowed to work freely, and study literature was assigned by the project leaders. Matters of trade and industry were taken up more in the future discussions than in the history circles.

No similar pattern was shown between the future circles. Among other things, this was due to the fact that one is confronted with different problems when regarding the future. In some communities the glasswork has been focussed on, and in other districts it has been the changes within the community. Each future circle is therefore accounted for separately in the evaluation.

Experts have often taken part in the future circles. Students from the School of Architecture in Lund carried out their examination paper within the frame of the project "In The Glass Empire", and participated in circles in three districts. The University in Växjö has been active in two districts. The circles' outside contacts were through politicians, local authorities and the management of the glassworks, etc. The experts which participated have greatly influenced the work of the circle and the result. Contrary to many other projects, they have, however, participated under the conditions of the circles.

Work of the future circles has been accounted for partly in reports from the work of the architect students in the circles, and partly in publications and exhibitions carried out by the participants. Besides these concrete results, the study circles with their work, for instance, have influenced the municipal authorities in certain matters of planning. Moreover, the circles have had importance for the two employee-owned glassworks which were formed during the period of the project.

About the evaluation

The aim of the evaluation has been to give rise to knowledge of the extent the study circle project has contributed towards the citizen's possibility to participate in changes in their community. The main motive of the evaluation should be the aim for progress, and should set guidelines for an eventual continuation of the project "In The Glass Empire", or for corresponding projects in relation to other matters.

The reliability of the evaluation is influenced by a series of factors. The evaluation is limited by, for example, the time and resources at one's disposal. Furthermore, our competence as evaluators plays an important role, as well as the approach we used for the evaluation. The reliability of the study is influenced by for instance, the representation of the chosen districts and the credibility of the inquiries returned and the interviews made.

Two main methods have been used in the collection of information. On the one hand, an inquiry has been distributed to chosen participants of the study circle. On the other hand, interviews have been used in order to follow up the inquiry replies

as well as to interview key persons. The collection of information was carried out in the following manner:

a) In the test district Orrefors, a test inquiry was distributed to both a future and a history circle. It was followed up by an interview. After revision of the above, the final inquiry was distributed within the chosen study circles. Out of eighty-six persons, seventy-eight answered the inquiry completely.

b) The answers to the inquiry were compiled and the inquiry was followed up with interviews in the respective circles.

c) Key interviews were carried out with persons from the municipality, business firm, county administration, grant donators, etc.

d) The documentation material of the project was studied. It contained, for instance, the reports from the circles, newspaper articles and protocol leaders.

A seminar was held in Emmaboda after the collection of information, with representatives from business firms, the county administration, experts who were involved in the project, leaders, etc.

The activity of the study circle has been evaluated in regards to both how the study circle has functioned as a working form, i.e. its organization and working methods, and to changes which the work of the study circle has brought about at their respective glass foundries and in the district.

The formation and carrying out of the evaluation has been influenced by certain conditions. For instance, it can be mentioned that the evaluation was carried out after completion of the project. The evaluators were not a part of the project leaders, and they lacked information about the initial phase. The work of the study circle alone has been considered to be just as meaningful as the result. Moreover, both the projects and the carrying out of the evaluation influenced the daily life of the Glass Empire district. Furthermore, the approach towards planning and evaluation by the evaluators was meaningful. This evaluation, in fact, comes into the frame of the action-orientated approach. This means that the interpretation of the situation is given major importance, and the function of the evaluation as an instrument for change is regarded.

"Goal — means — result relation" are the centre-points for our evaluation. If an evaluation is to be carried out, the goal must be decided. In order to organize the goals we have chosen an hierarchical division.

Since the goals of the activity are seldom defined in the beginning, certain difficulties often occur with interpretation and logical organization. In the case of "In The Glass Empire", certain goals for protocol, brochures, applications, etc. were stated. These are, however, neither consistent nor expressed in "measurable" way. The picture is even more complicated by the fact that the idea about the future circles increased during the time that the history circles were in progress.

In the case of an action-based evaluation, the importance is placed on the emergent goals of the different actors. Interviews have been made with different key persons in order to relate the goals to the actors. (Several of the participants have answered an inquiry and material has been reviewed; reports from the future circles, binders with documentation material of the project leaders, etc.)

The hierarchy of the goals below describe our summary of the ambitions of the project.

Conclusions

The participants of the circles as well as the project leaders are, on the whole, positive towards the new working form which has been tested in the study circles. There are, however, both positive and negative experiences from the work in the study circles. In the history circles it was appreciated to have the chance to take part in the circle and to learn how the workers lived and worked in earlier times. In the future circles it was considered meaningful to be able to discuss openly, to have respect for each others opinions and cooperation. It was found that the most important factor in the history and future circles was the ability to give rise to something and create

something, for example, write a report or conduct a constructive dialogue with the authorities.

The negative factors were that few women and young people took part, and that there was a shortage of time in making out the reports.

Furthermore, the study circles considered the study material to be insufficiently adapted to their needs.

It can thereafter be recommended that one ought to strive after longer duration of the work of the study circles. Experience and results from precious years ought to be interwoven with the on-going activities. It is also important to broaden the recruiting in order to be heard in municipalities, and by others. In order to bridge the problems in systematizing the work, one should take better advantage of earlier research and documentation. Furthermore, it is important to continually conduct a discussion of goals. The free form shouldn't imply that the work lacks goals.

An evaluation could come about in many approaches and therefore interpret the results in varied ways. The degree of success or failure can seldom be determined. We have therefore presented two different perspectives on how the results of the study circle project can be interpreted. The first interpretation points to the fact that the project seemed culturally regenerating and has created self-reliance. The other interpretation states that the circles weren't successful in developing a local strategy in order to save the jobs in the Glass Empire.

